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GAS JOURNAL

LIGHT ✦ HEAT ✦ POWER ✦ BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

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EDITORIAL NOTES.

Second Reading of the Gas Regulation Bill.

THE feeling of the House of Commons on the scheme submitted in the Gas Regulation Bill for the reformation of the basis of the operations of the gas industry and rehabilitating its financial position was pointedly illustrated by the brevity of the discussion, and the cordial endorsement of proposals and principles, when the Bill was read a second time last Tuesday. It was the general view that something had to be done for the industry, and that whatever dressing-up or modification was needed in the clauses could well be accomplished by free discussion, point by point, round the table in Standing Committee A, to which we see by the "Votes" the Bill has now been allocated. This is a very proper view; for the Board of Trade, who know so well the misfortunes the gas industry has suffered through the war and from legislation that has no congruity with these new times, have put forward in the Bill what they conceive to be a practicable and healing scheme, albeit technical efficiency and manufacturing economy will, in the interests of the industry, the gas consumers, and the nation, claim some changes in detail. The gas industry is simply being temporarily kept together as a business enterprise by its large reserve of innate strength. But its pre-war strength has been, and is being, rapidly weakened by the inroads into it of the new economic conditions, owing to countervailing power being absent through old and now unfit legislative restriction. This was fully recognized and represented by Mr. Bridgeman, the Parliamentary Secretary to the Board of Trade, who, in moving the second reading of the Bill, appealed to Parliament to remove the handicaps the industry has had imposed upon it, to the detriment of its active service, not through its own fault, but purely owing to all too well-known extraneous circumstances.

The recommendations of the Board of Fuel Research were sketched by Mr. Bridgeman; but the House seemed quite willing to accept these without question—coming from such a quarter. There was, however, an indication in a speech by Major Barnes that he, at all events, is not satisfied that the narrow restriction proposed as to inerts will not jeopardize the realization of the utmost economy for the gas consumers of the country. The gallant member does not profess to know much about the question; but it may be taken from his remarks that this is a subject to be discussed in Committee. This is what the gas industry wants. It desires to gain nothing by false pretences; neither does it wish its economic position to be seriously prejudiced through undue restriction in respect of nitrogen and carbon dioxide. Nor does it want freedom in this matter without offering the best assurances that scientific research can supply. The industry can offer such assurances; and on the strength of them it claims liberty, and holds that the consumers are abundantly safeguarded from any excess, as this would mean a depreciation of the quality of service, and consequently a courting of self-destruction. With heat units, and not volume, as the basis of future business, there is a certain protection to the buyer. The only reason for freedom in the matter of inerts is economy in the production of heat units; and, with dividends dependent upon reductions in the price of heat units, the consumers' interests are thoroughly safeguarded, and in a two-fold way. While speaking here of the discussion that there will be in Standing Committee, it may be said that it is just possible the question of pressure will be again raised; and this largely owing to the difficulties experienced in a few out-of-the-way places by deficiencies of pressure in the case of certain important consumers. In some instances the dissatisfaction is found in the areas of non-statutory concerns, whose position under the Bill is a little bit nebulous. Some people seem to think they are excluded from the Bill; others that they are included. But whether included or not, they will probably find they will have to change to statutory status before long, in order to realize the advantages that the Act will confer.

No sane man can argue that the gas industry should be chained to old conditions and terms that have no longer any being, but have been superseded by heavier and more rigorous ones. Mr. Bridgeman spoke of the manifest injustice of this, and of the obligations on the industry having enormously increased. Many people conveniently overlook this increase of obligations in assessing the reward that the industry should be allowed. Gas undertakings have to maintain the gas service to the community; but the maintenance of this service has involved them in heavier costs for everything that is required—capital, plant, manufactured goods, materials, and labour. The maintenance and renewals of old plant are on the new level of costs. For rendering the same service much more capital per unit, and more revenue (less any economies that can be effected in production), will be needed. It is true beyond any contention that the obligations of gas undertakings have enormously increased, and not only in relation to costs. It has been proved over and over again, and is being proved daily, that gaseous fuel, distributed by underground channels, is the chief domestic and industrial fuel of the future. The increased obligations of gas undertakings are therefore not confined to something only of immediate importance, and not of an order that will in future have unvarying weight, but progressively they must be of a still more imposing character. There are men who are of opinion that under these conditions standard, or minimum, or maximum dividends should have a strict relation to those of the days that are dead, despite the change in the value of money. To be too niggardly in this respect would impose a fresh handicap on development and economy. Mr. Bridgeman points to the necessity for the confidence of the investing public being restored to the industry; and we are very glad to see his recognition of a point that has frequently been made in the "JOURNAL," that in order to secure this restoration of confidence there must be some assurance of permanency. How will the Board of Trade attempt to give the assurance of permanency when faced with the problem after the Bill becomes an Act? We see Mr. Bridgeman spoke of the continuance of the sliding-scale; but the sliding-scale in the old form will not alone give the sense and assurance of security. It did at one time; but the war has shown the fallacy of associating the sliding-scale (without some modification) with absolute security for investors. The terms of the past were considered amply safeguarding; the war proved the contrary. The terms that may be fixed under the Act may be, by those who have taken no heed of this particular lesson of the war, regarded as sufficiently safeguarding without the introduction of new conditions. Who among them, however, knows what cataclysm may again be in store for this country or the world that will bring about a wide separation between the now current and then existing

economic conditions? We see nothing for it but that a new item shall be inserted in the sliding-scale which will ensure a minimum dividend, or that the standard dividend shall be made the minimum on the lines of the South Metropolitan scheme for dealing with gas price, dividends, and labour participation. There is here a suggestion and an opportunity for the Board of Trade to make a bold stroke in respect of an innovation calculated to contribute to industrial peace and progress.

We were glad to see that one of the labour members, Mr. Hayday, who is officially associated with the Joint Industrial Council for the Gas Industry, seconded the motion of Mr. Bridgeman. We are pleased because to us the support indicates something more than self-interest. It shows that there are men in labour circles who recognize that industry cannot give maximum employment if its vitality and capacity for development are weakened by an insufficient recompense to capital, which stops or lowers the flow of capital into it. Mr. Hayday has also something else in view. He knows that the position of the industry is not what it should be; and he realizes the critical position in which it stands with the unionist workers in the matter of a strike for higher wages. It may be inferred from his speech that he sees that these conditions are antagonistic. He for one wants to see a strike averted; and he believes a strike would be averted if the Bill could go through before June 26—the day on which it is proposed the strike notices shall terminate. This means that, with the Bill an Act, the industry would then be in a position to negotiate terms in respect of the demands which the Federation of Gas Employers cannot entertain in present circumstances. It will be remembered that the gas industry has never said that it will not pay a further increase in wages. All it has submitted is that its position will not allow gas undertakings generally to pay more at present. But when relief is secured which will improve the financial state of the industry, then will be the time to discuss reasonable additional terms. To get the Bill through before June 26, however, will mean rapid work. If it can be done, so much the better, if thus a stoppage of the industry can be avoided. Labour no doubt appreciates that a cessation of the supply to every home of such a necessary as gas is something that—being caused by an application for wages and other conditions of employment, over and above what has been previously granted, and this demand upon an industry in the present condition of gas supply—would raise public indignation. Moreover, it would mean the stoppage of heat and power to many industries, a big reduction of employment in those industries, and so a big diminution of the country's production during the time the stoppage continued. Touching this point of the attitude of the Labour Party towards the Bill, Sir F. Banbury, speaking towards the end of the debate, went altogether astray as to the objects of the Bill. He seems to have got the notion that the Bill was proposing to allow extra charges in order to pay higher wages. If he had been present and heard Mr. Bridgeman's complete statement, he would have known that the Bill is needed in the first place to render justice to share and stock holders who have for years been deprived of fair dividends, and have had the mortification of seeing the market values of their holdings depreciate by something like 50 p.ct., and more in some cases.

One other interesting point was raised by Major Barnes, who objected to the Bill taking powers which have hitherto been exercised by Parliament, and vesting them in the Board of Trade. It would appear that Major Barnes has overlooked the fact that the Board of Trade are only called upon to do the detail work necessary for carrying-out principles which Parliament is asked to establish by the Bill. These matters (which have usually formed the subject of Private Bills) will still come before Parliament under section 10, but by much less costly and much more expeditious machinery. This will be a benefit not only to the industry, but also to Private Members of Parliament, who will be relieved from the immediate necessity of sitting on Committees to consider some eight hundred Private Gas Bills. A simplification and acceleration of procedure will not run counter to either the practice of Parliament or the trend of modern thought. The affairs of the electricity industry have been delegated to the Electricity Commissioners and the Ministry of Transport. Just recently, too, the Speaker's Conference recommended a large devolution of the work of Parliament. Major Barnes evidently is in disagreement with the Speaker and those who were associated with him in the scheme.

Stimulation or Guidance for the Gas Appliance Makers.

IN his Presidential Address to the Institution of Gas Engineers, Sir Dugald Clerk made the suggestion that a "Gas "Institute" should be organized for studying, testing, and reporting on gas-consuming appliances, whether for heat, motive power, or light. We do not much like the suggested name; but the name is of small concern compared with the objects and the results. As to the objects, we are in for a vast change in the industry in respect of gas supply. B.Th.U. are in future to be sold, and not cubic feet; and this fact alone is going to enable the industry to get more B.Th.U. into their distributing system per ton of coal carbonized, and so reduce the expenditure for raw material per heat unit, do something towards conserving the coal resources of the country, and at the lowest possible cost put at the disposal of the community a labour-saving and convenient heat producing agent for domestic and industrial purposes. Sir Dugald's attitude is this: The work in raising thermal efficiency at the producing end is good. But gas-consuming appliances must be suitable for the gas; and only their suitability will, rightly used, enable the generation of the maximum heat efficiency in service. It is also thought by Sir Dugald that the testing, reporting, and certifying by an accredited organization of the kind would foster and stimulate a healthy rivalry on the part of the makers, and would encourage invention among them—all to the advantage of the gas supply industry, and through the industry to the material benefit of the makers themselves.

All this is good; no one can deny it. But there are certain considerations. In the first place, Sir Dugald's inspiration in this matter is drawn from the automobile world. The gas-appliance manufacturers are not numerically of the same strength as the makers of motor cars of various descriptions, with all the mechanism and accessories entailed by such modern productions; and with the amalgamations there have lately been among the makers, the area over which encouragement to competitive improvement could be exercised (such as Sir Dugald has in view) is comparatively limited.

This brings us to the second part. Is it encouragement or guidance that the makers of gas appliances need? We see no signs of any incentive to good work being required by them. The old rule-of-thumb methods have long since been abandoned by the makers; and the ancient ruts have been dug in, and are no longer traceable. Recognition has been made by them that the maintenance and progress of their own business interests depend upon the satisfaction of the user of gas. The result of this recognition is that the makers of gas-heating appliances have to-day larger technical staffs than ever, and they have research departments, in which the work of exploration is continuous. The fruit of their effort is seen in the efficiencies and serviceableness of the newest appliances. All this goes to show that it is not so much encouragement as guidance that the gas-appliance manufacturers need. We have sufficient intimacy with their methods to know that they are not unappreciative of suggestions from any quarter. They themselves willingly confess that they have profited in their own research and improvements by the suggestions that have reached them through the Gas Investigation Committee; and they readily admit that this work shows them fresh fields and pastures new for more critical exploration, with the view to discover the most practical way of effecting the necessary changes in structural design, to meet the new requirements of gas supply. What is utterly wrong in the gas industry is that the technical men of the gas-consuming appliance makers are not in sufficiently close touch with the work of and changes in the gas industry, nor the technical men of the gas industry sufficiently in touch with the technical work in the factories of the gas appliance makers. In consequence, maximum efficiency is injured, to the loss of the industry. There is something here that requires bridging-over; for we are fully satisfied that in this matter of attaining maximum efficiency in gas appliances the industry and gas-stove makers are not going the quickest way to work.

The quickest way is the co-operative way. It requires a Joint Committee to examine into, and to lay down the lines of, new requirements that have developed and are developing at a fast rate due to the altered character of the gas supply. We see this in the third report of the Gas Investigation Committee. Different compositions of gas require in gas-fires different size radiants and nozzles, which, with the

gas injectors, should be interchangeable for different gases. A wide range of regulation is desirable. The interchangeability is necessary in view of alterations in the declared calorific value that will be made periodically by different gas undertakings. To do a certain amount of work under a given set of conditions, it is a *sine quâ non* that (assuming that in the different grades of gas the heat units are equally developed in use) the same number of B.Th.U. must be supplied, no matter the calorific value of the gas. The Board of Fuel Research in their original report made a useful suggestion as to what should be done initially in the way of meeting the new conditions in gas supply. They urged the desirability of the producers of gas and the makers of fittings and burners jointly deciding—that is to say, at the outset of any change—on the standardization of burners in appliances for a limited number of calorific powers. It was suggested that for this purpose four standards might be sufficient—400, 433, 466, and 500 B.Th.U. "If these," it was added, "are regarded as minimum figures, the adjustment in each "case should admit of an increased aeration to suit gases "up to the next higher level." There is a good suggestion here for a start; but, good as it is, there has been no visible attempt to act upon it—the gas suppliers are simply going their way still, and the makers of gas-consuming appliances their way.

If encouragement to prosecuting work that will inure to the benefit of the gas industry and themselves is needed by the gas-appliance makers, then let it by all means be given, either by the method suggested by Sir Dugald Clerk or by some other. But we do not think any incentive is really called for, when such a display of willingness to improve is evidenced all round us. In our view, more co-operation and guidance are the desiderata to secure the utmost efficiency under given conditions. But no doubt Sir Dugald's proposal modified would be an advantage. If a testing-station were provided to test samples of new designs of appliances, and to certify their efficiency for gases of specified calorific power, composition, and pressure, this would no doubt be a benefit, as certification would show that the makers under those conditions had reached the goal. With the Gas Investigation Committee at work, and research in full swing at Leeds University, and what the gas-consuming appliance makers are themselves doing, we are quite certain that something less than Sir Dugald attempted to suggest in rough plan would suffice.

A Special Problem for the Welsh Institution.

WE regard the paper that Mr. H. D. Madden read before the Welsh Institution of Gas Engineers and Managers last Thursday as important, and more particularly so for Wales, for the reason that Wales as also the neighbouring areas have problems in relation to gas supply that are peculiar to themselves, and which at the present time press for solution. It is probable that before long the gas undertakings of Wales, in common with those in other parts of the United Kingdom, will be manufacturing and selling gas on the heat-unit basis; but the local gas coals are among the worst in productive capacity, whether judged by cubic feet or heat-units per ton, or secondary products. In that fact is found a reason—specially appropriate in view of the changes in the industry—for a suggestion that Mr. Madden made, and which may be accentuated. He believes that we are only at the initial stages of knowledge relating to Welsh gas coal, and that much can be achieved in supplementing it by united concentrated efforts and pooling of information. But Mr. Madden is too modest in his proposals for getting together information which shall be of value regarding a matter that is of paramount importance to the gas undertakings of Wales. He suggests informal technical meetings, at which local experiences can be related with the defined object of obtaining the best ultimate results from the minimum of raw material used—that is to say, from Welsh gas coals. The data collected beforehand from all works, with the discussion that would ensue, would form the basis of a "Local Investigation Committee." Why stop there? The best means of utilizing the poor gas coals of Wales to realize the maximum result is such a big economic problem for the gas undertakings throughout the Principality and the neighbouring districts, that it should handsomely pay the gas-works to at once organize a special research, with a competent research chemist of their own, to thoroughly explore the matter from A to Z. The difficulty, of course, would be the experimental plant. This would cost money; but it is wonderful what can be done by co-operation where there is the will. We feel confident of this, after carefully reading Mr. Madden's paper, that the investment would be highly profitable. If the gas undertakings of Wales are only at "the initial stages of knowledge relating to Welsh "gas coal," then they have much to learn, and the sooner they get further the better. Many other good points are found in the paper—all akin to the same subject. There was the plea for the bringing of more and more trained scientific brains to bear on the supervision and control of gas-works processes. It is vital to the industry that this should be done. Men, however, must be scientifically trained for the industry's work; and all gas undertakings should see to it that nothing stands in the way of securing such training.

Coal Stocks and the Miners' Domination.

ONE topic among several touched upon by Mr. R. Hamilton, of Dalkeith, at the meeting of the Waverley Association on Friday was that of coal stock accumulation against next winter's requirements. Whether fortune in this respect will be good or bad can be at present only a matter of speculation. Mr. Hamilton ventures to predict that there will be great difficulty in obtaining increased supplies to build-up a reserve sufficient to meet the demand next winter. If this is so, then the Coal Controller, and all those who are taking part in trying to prevent any repetition of last winter's worries and hairbreadth escapes from disaster through coal shortage, will be greatly disappointed. This is one of the principal objects of the decentralization of coal control so far as purchase and distribution are concerned, and placing the duty in the hands of the reinforced District Coal and Coke Supplies Committees, of the further limitation of coal exports, and of the placing of colliery owners upon their mettle in proving before control finally ceases that they can completely satisfy the country. Whether the object will be realized depends very much upon the miners. Their output is the controlling factor in the situation; and output is very much the subject of their will and caprice. Now that the owners see greater freedom ahead, they are considering schemes for colliery development in various directions. As we look in one direction, we are full of hope regarding supplies; as we look in another, the hope is very much damped-down.

Hardly a morning passes but that we see the miners in some way or another attempting to dominate policy, and everything else. The Government determine upon action with the view to placing the coal industry upon an economic basis, and make the business support itself, instead of the home consumption being subsidized by the profits from the sales abroad. The miners come along and propose an increase of wages on the assumption that the industry is going to produce a greater revenue. They propose and operate on pure hypotheses. The ability of the Government to sell coal cheaper for a term in this country has been the surplus from the high price per ton of the coal exported, multiplied by the quantity. The quantity is to be reduced to satisfy home demands; and therefore the income cannot be so great. The price of bunkers has been lowered to help to diminish the cost of freights; so here again revenue is affected. But some of the miners are pressing for an immediate advance (there is talk of 5s. a day) in respect of the general increase of 4s. 2d. per ton in price, and the withdrawal of the rebate of 10s. from domestic coal. The largest item in the increased cost of coal is the advanced payment to the miners. That there exists in the minds of some of the miners' leaders a little doubt as to the proposed new demand having a justifiable foundation appears to be indicated by the resolution of the Executive of the Miners' Federation and of the conference of delegates last Thursday to postpone decision as to the amount of the demand until the annual conference of the Federation, which commences on July 6—this time at Leamington. By then the Executive will have had an opportunity of considering data which are to be prepared and published by the Government in reference to the financial situation of the industry under the new order of things.

However, this all goes to show the spirit of domination that exists among the miners. If they wish to get the coal industry on to a proper economic basis again, and have a desire to promote its prosperity, then, and only then, will production become of such an order that it will enable the best aspirations to be fulfilled of those who are seeking to

bring about gradually the decontrol of the industry. This is one of the ways to cheapen the cost of living. Another way is to improve the quality of the coal by its separation from dross; and this is a highly important matter in connection with supplies, transport, and national economy and efficiency. That the miners will not see this can only be attributed to the blindness produced by selfishness. However, if the demand for more wages is made and granted, it will simply mean another rise in price, and then another wage demand; and we shall be in a worse plight than ever, and supplies will be no better. However, we are hoping, with very scant ground for doing so, that wiser counsels will prevail. Meanwhile, the public are finding more and more that the use of gas as a fuel lends itself to economy, owing to the ability to limit consumption to the bare period of required application, and this with larger efficiency. The price of gas has only risen about 80 p.ct. since the war, and in some places not that. But assuming it has increased 80 p.ct. all through the country, it stands at the bottom of the long list of commodities whose prices have climbed to much higher percentages. But, singularly, the fact does not stand to the credit of the industry in the public mind.

The Strike Notices.

Although Mr. Arthur Hayday, M.P., seconded the motion for the second reading of the Gas Regulation Bill, he is not at all sanguine that the representatives of the gas employers and gas employees will be able to arrive at an agreement before June 26—the day appointed not by the employers but by the Union for a stoppage in the gas industry. This is a view expressed by him (which is not shared in by many of his colleagues) at a meeting of Nottingham gas workers on Sunday. He told his hearers of the poor condition of gas companies in the matter of dividends; and it is his deliberate view that, if the companies had agreed to the workers' new demands without the Government making some provision for them to recoup themselves, quite a number would have "cracked up" altogether. But Mr. Hayday is fair-minded. He does not think that while the present system prevails, it is any part of the workers' policy to break down industry in this manner, if they are assured that some means would be found to enable the companies to meet their obligations. A conference between representatives of the Union and the Gas Employers' Federation is to be held to-day; but he is dubious as to the result. Much, in Mr. Hayday's opinion, depends on the Bill which is to readjust the conditions of the industry; but he appears to fear the reception the Bill will get from the manufacturers in the House, who, he thinks, will naturally do their best to restrict the operation of a measure "which will lead to their gas costing more." If the manufacturers opposed the measure, they would be voting against the principle of capital receiving a fair—not exorbitant—return; and this they would be very foolish to do.

The Number of Men Affected.

A few weeks ago, it was said that the number of gas workers affected was 95,000 to 96,000; but this included Ireland, which, according to Mr. Hayday, is not now affected, because the men come under the engineering awards, so far as they are organized. Also, the season is advanced to the period of minimum working strength; and of the 60,000 or so now affected, 40,000 are members of the National Union of General Workers. No one, Mr. Hayday holds, can accuse the Union of using undue pressure or threats; but they are not going to allow their men to be anything from 6s. to 12s. below the lowest national award—London is 6s. and Nottingham 8s. behind the award to the engineering trade labourers. "This quarrel is not of our seeking," Mr. Hayday said later, "and the negotiations have been conducted by men of reputation in the trade union world." There is no ambition to obtain public popularity by kicking up a row. Their sole desire is to insist that the wage earners represented by the Union shall not be left behind in the race. Nobody will be more delighted than they if it becomes unnecessary to cease work; but it must not be thought that they will sacrifice their men for a patched-up settlement. He also mentioned that they have had a volume of letters from electricity workers, who want to throw in their weight. If it becomes necessary to use their aid, the Union would be glad to do so. But it is a very big question. This and the preceding paragraph show the attitude of the Union as described by Mr. Hayday; and we do know that negotiations by the leaders have all through been conducted in a way to which exception could not be taken.

Expenditure for Gas Regulation.

Under the Gas Regulation Bill, Referees and a Chief Gas Examiner are to be appointed for the whole country, instead of for the Metropolis only; their expenses will properly have to be paid by the gas industry. In performing their functions under the Act when it comes into force, the Board of Trade will be put to certain outlay. In order to meet the costs, the Bill, it will be remembered, proposes to provide for an annual contribution, from all undertakings making more than 100 million c.ft. per annum, not exceeding £15 per 100 million c.ft. manufactured—"sold" would be far better. A White Paper shows that an estimate of the maximum income at the £15 rate would be £32,000. But it is not expected that the expenditure will exceed £20,000 a year; so that a much less sum will be required per 100 million c.ft. It is proposed that for the first two years the expenditure shall be paid out of money provided by Parliament; but in the next three years the loans are to be repaid with interest. Thus in the matter of expense these three years will be bearing more than their normal quantum.

Gas Section at the Crystal Palace Exhibition.

It is fit and proper that there should be representation of the gas industry at the Imperial War Museum and Victory Exhibition that is being held at the Crystal Palace, and will continue open until next October. The gas industry took a prominent part in providing the materials for making explosives, antiseptics, and many other things required in the war; and for this reason alone, it should be there. It has through the enterprise of certain companies and firms (whose exhibits are noticed in an article later in this issue) quite a respectable display of the modern applications of gas. But it is a pity, in view of the wonderful collection of war exhibits, that there was not put in evidence the explosives materials and chemicals supplied by the gas industry, as well as examples of the gas-furnaces that had such an important part in the making of munitions of all kinds.

The Coal Industry Bill.

The Government, having wisely declined to be led into nationalization by the Coal Miners' Federation, have to make some provision for the better control in future of the coal industry, and to keep in closer touch with its affairs. The Bill—so long promised, and so much talked about—which is to provide for the working of the industry is expected to be introduced this week; and those who claim inside knowledge say that in some respects the scheme will be on the lines of Sir Arthur Duckham's report. But if the prophets are true, in one important respect there is to be a great departure from the Duckham plan. There is to be no Ministry of Mines; but there is to be an additional Parliamentary Secretary to the Board of Trade, who will be known as the Secretary of Mines, and will be responsible for the exercise of the powers relating to the mining industry which are now in the hands of various Government Departments. In effect, the scheme will create a new Department of the Board of Trade, and nothing more. A Committee is to be appointed the composition of which will include owners, workmen, and others, and we hope that the "others" will embrace representatives of large consumers, such as the gas industry. It is said that it is necessary that the Bill should become law before Aug. 31, as the Coal Emergency Act, passed in the early days of the present session, expires on that date.

Institution of Gas Engineers and a Visit to France.—The Council of the Institution of Gas Engineers ask us to state that the Council of the Société des Ingénieurs Civils de France are arranging, for June 22 to 25, a visit to Paris and to the devastated regions of the North of France, in which members of the Institution of Gas Engineers are invited to participate—it having been decided, in order to make the visit as comprehensive as possible, not to confine it only to members of the British Section of the Société, but to admit all members of recognized engineering institutions in the United Kingdom. Ladies will be welcome on this occasion. Details will be given by the Hon. Secretary of the British Section of the Société, No. 45, Great Marlborough Street, W.

PERSONAL.

Dr. CHARLES CARPENTER is succeeding the late Dr. R. Messel as the representative of the Society of Chemical Industry on the governing body of the Imperial College of Science and Technology.

Mr. E. HEATH, late of Wantage, is now in charge of the Haverhill (Suffolk) Urban District Council Gas-Works.

Mr. H. DUMBLETON, the Engineer of the Alliance and Dublin Consumers' Gas Company, who recently reported on the Navan and Trim gas undertakings, has now been called upon by the Drogheda Corporation Gas Committee to do similar work for them.

To fill the vacancy occasioned by the resignation, through ill-health, halfway through his period of office, of the Mayor of Nottingham (Councillor J. Morris), Alderman ALBERT BALL, the Chairman of the Gas Committee, who previously filled the position in 1909-10, was unanimously elected at the last meeting of the City Council.

OBITUARY.

Sir FRANK MAPPIN, Bart., died on Sunday week at Sheffield, in his seventy-fourth year. Sir Frank was the eldest son of the late Sir Frederick Mappin, and ten years ago succeeded to the baronetcy, which was conferred on his father in 1886. His business life was spent at the Sheaf Works of Thomas Turton and Sons, of which for many years he was Managing Director, following his father. He filled many positions of public trust in Sheffield, including membership of the Council of the University.

The death is recorded of Mr. JOHN ARMITAGE, of Normanton, in his 85th year. He was appointed Secretary to the Normanton Gas Company in 1876, and shortly after took up the dual position of Secretary and Manager, which he held up to his retirement in 1895. He remained connected with the Company till his death, being Chairman of the Directors.

ELECTRICITY SUPPLY MEMORANDA.

BEFORE the war there were quite a number of small places that were considering the question of laying down electric plant. If they ardently desire electricity, they will regret the delay that was made; for capital expenditure, and costs of maintenance, and renewals, which form such a large part of the expense of providing electric current, have since altogether defaced the similar costs of 1914. All other costs of production have risen, and are not likely to return to the levels, under equal local circumstances, of those that obtained in pre-war times; but there would have been an advantage for the towns that were contemplating plant had they secured it on the pre-war terms. Lurgan is an Irish town that in 1914 had in view an electric plant; and now the Council are picking-up the threads of the matter again, and are seeking to learn what the capital expenditure would now mean. Athlone is considering a scheme; and the estimates predict—"predict," mind you—a net profit of only £378; and this with a charge of 1s. per unit! Athlone should look down the "Electrical Times" analysis of electricity supply concerns, and see how many of them find net profits a *minus* quantity. There was an interesting fact—one among many—brought out in the paper that Mr. Joseph Fisher presented at the annual meeting of the Institution of Gas Engineers; and which we published last week. It is that in England and Wales there are no less than 300 villages of 3000 to 10,000 inhabitants, and 97 small towns of over 10,000 inhabitants, in all of which there is a gas supply available, but no electricity. As he remarks, in some of these it is probable an electricity supply would not be profitable; but as to the remainder, the question is how best to meet the requirements (so far as they exist) of these small communities. What are the chances of them being met by the new schemes? In the majority of cases very remote. If they could be profitably brought within the scope of supply of the existing undertakings, this would have occurred before the present time. But with miles upon miles of cable to be provided, and all the distribution expenses and losses, the administrative expenses, the relatively small demand compared with a town's supply, and the heavy charges that would have to be made (with all expenses from capital onwards on the lines of to-day), there seems only one solution to the problem, and that is a locally generated supply on the cheapest possible basis.

Problem of the Small Community.

Mr. Fisher says that in the 400 (or so) villages and towns of which he speaks, there exist gas-works. The gas business is established; and, if there is profit in it, the addition of an electricity supply business to the gas business would be the cheapest route to provision. The gas-works have a site, management, men, office accommodation, and fuel. If there is a demand, surely it is better to give it through an existing channel at a cheaper rate than it is obvious it could be supplied at through a newly established organization, providing, of course, there is profit in the scheme. With changes taking place in gas-works processes, there is better opportunity now for contemplating this. Whatever business was done by electricity, the outlook shows good compensation for gas being provided by cooking and heating. It must always be remembered that, generally speaking, purses are not so long in rural communities as in the cities and towns. We do not think that—looking at the figures Mr. Fisher furnishes as to the working by the Tottenham Light, Heat, and Power Company of the electricity undertaking at Wood Green—the consumers of electricity for lighting purposes have anything of which to complain in comparison with the charges of other electricity companies. The prices are on a graduated flat-rate—7d. per unit for the first 100 units, and 6½d. per unit over that per quarter. And for power the prices range from 4d. to 3d. —the average revenue received being 5·49d. per unit. For these times in an area where the demand cannot be expected to be of an unlimited order that is not exorbitant. On these prices, the revenue account last year shows a profit of £990. Electrical people may not, in all respects, agree with the policy of the Company in having a flat-rate for all domestic purposes, and for charging 3d. to 4d. for power units. This policy is on the same lines as are followed in connection with the gas business; so that no difference is made between gas and electricity. Charges are made for power which are satisfactory to the lighting consumers; and the lighting consumers (who are the real backbone of the business) reap the advantage in having current at a reasonable rate—as things go to-day. It may be considered that the fuel expenses at Wood Green are heavy. But these must not be judged on a fuel cost basis alone. The supply of gas direct to a gas-engine cuts out all the capital, maintenance, and labour expenses associated with the generation of steam. Moreover, the gas industry cannot, until the Gas Regulation Bill is passed, altogether forsake its present statutory obligations, and settle-down on to its new basis of working and of doing business. When it does, it is hoped progressively to sell heat units at a cheaper rate; and the gas-driven electricity supply station will then reap the advantage. Speaking from his experience at Wood Green, Mr. Fisher is of opinion that for small and isolated cases, there is no doubt that the gas-electric station would prove the solution of the electric supply problem.

Charges, Policy, and Fuel.

There is as yet no ebb in the flow of prices for electric current; and every week sees fresh places adding to their percentage advances on the charges for current. Unless policy be reversed, and percentages converted into parts of flat-rates, then the charges to the consumers will (in all probability) always have a percentage hanging to them as a memorial to the difficulties and changes that have occurred since 1914. We see no advantage now in this since the war has passed, and new economic conditions have replaced those that had existence before percentage additions began to be made, and were then regarded as purely temporary. Here and there suppliers are proceeding with the conversion; but the instances are very few. It is observed, for example, that the Electricity Committee of the Shoreditch Borough Council deem it desirable to abolish the present system of charging for electricity, which includes the adding of percentages to the pre-war rate. The scale proposed is: Lighting: Maximum demand, 8d. for the first one-and-a-half hours daily, and 3½d. per unit for all electricity consumed thereafter. Flat-rate, 6½d. per unit; theatres and music halls, 6d.; and outside arc lighting and electric signs, 4d. per unit. Heating: 1½d. per unit if taken in conjunction with a lighting supply. Power: 30s. per quarter per E.H.P. of maximum demand, *plus* 1½d. per unit (maximum charge, 2¾d. per unit). A special rate of 4d. per unit for trade and testing purposes is also proposed. Discounts varying with the amount consumed—ranging from 2½ to 10 p.ct.—are to be allowed. Those electricity administrators who are bold enough to make the power consumers pay their fair share of the increased costs, and not pile it on to the lighting consumers, are doing the right thing. As an illustration, take Rotherham. Here the Town Council have made the increase in the charges for power and heating 100 p.ct. above pre-war rates, and lighting 50 p.ct. The Halifax Corporation Electricity Committee have resolved upon a new clause in their agreements with all power users. It is to the effect that if in any quarter the average price of coal (pea slack) delivered at the electricity works is above or below 8s. per ton, the price per unit to be paid by the consumer shall during the quarter be increased or reduced by 2½ p.ct. for every 6d. or portion of 6d., provided that no increase or reduction shall be made or allowed unless the price of coal exceeds 9s. per ton or is lower than 7s. per ton. But what about the increases in labour, capital, maintenance, and renewal costs? The Dublin Council are now so anxious—they were not always so, judging from the deficits of past years—to carry on the undertaking without loss that they are applying to the Ministry of Transport for permission to increase their maximum rates. Their proposal is that the future maximum charge within the municipal area shall be advanced by 50 p.ct., which means from £2 to £3 for amounts up to 60 units, and from 7d. to 10½d. per unit over 60 units. We see, too, that the Hammersmith Electricity Committee have found that, owing to the rapid increase in costs, an estimated surplus of £3582 at the end of March next will be changed to a deficit of £13,688, unless prices are raised for lighting to 7d. per unit, and all supplies for power, heating, cooking, and industrial purposes are increased by a further 50 p.ct.—bringing the charges up to double the pre-war rates.

Revision of Prices.

Critics Correct Each Other.

The writings in the electrical press over Sir Dugald Clerk's statements as to the relative positions of gas and electricity in coal conservation become more amusing every turn that is made. Mr. B. L. Klemens, it will be remembered, attacked Sir Dugald on points, and made a mess of the whole performance. His mistakes were pointed out by Sir Dugald and in our columns. Mr. Klemens does not seem prepared to come to close quarters with these mistakes and the corrections. The "Electrical Review," too, made some statements which we regard as showing more prejudice than actual knowledge. Then Mr. Klemens had some correction administered to him by Mr. G. W. Stubbings who (as was pointed out in the "Memoranda" in the "Journal" for May 25) would have saved himself from some criticism had he not also dropped into fundamental mistakes through not having informed himself as to the conviction of error of Mr. Klemens. Now this gentleman in a letter to the "Review" slaps Mr. Stubbings on the back; and, though this gentleman took a more enlightened view of the position than Mr. Klemens, the latter has afew words of praise for him. But he points out that Mr. Stubbings has also made slips in not having seen that he (Mr. Klemens) had altered the efficiency of the gas-oven from 13·6 p.ct. to 7·4 p.ct.! How the "Review"—presumably a paper that desires to be taken seriously in these matters—can publish such nonsense even from a correspondent we do not know. And again Mr. Klemens chides Mr. Stubbings for not having noticed—though he (Mr. Klemens) displayed a vast personal ignorance of the subject by in his first article giving 4 cwt. of coke as the amount available for sale from the carbonization of a ton of coal—the correction to 8 cwt. that appeared in his third article. The 8 cwt., too, was wrong, as we have shown on more than one occasion by quoting the actual figures as to coal carbonized and coke sold last year by the two largest Metropolitan Gas Companies—a quantity of coal carbonized exceeding 3 million tons, and slightly over 10 cwt. of coke actually paid for, as shown by the published accounts. It is really no use discussing Mr. Klemens' figures. He will not deal with those that are authoritatively put forward, but adheres to his own calculations based on a fine ignorance of gas manufacture, and an efficiency for electricity of 20 p.ct.! The gas industry is generous to the electricity industry in making its comparison on a hypothetical generating efficiency of 20 p.ct. throughout the electricity supply industry. But for any electrical man to utilize this figure, and only the average efficiencies for gas (sometimes not even these) that are actually obtained to-day, and not the maximum efficiencies, is doing something that is best described under the heading of "false pretences." Electrical men who honestly survey the situation know that 20 p.ct. as a general electricity generating efficiency is never likely (so far as can be seen at present) to be realized throughout the dissimilar conditions existing in the United Kingdom. Mr. Klemens seems to be doubtful about the gas industry's future coke market, if its consumption of gas increases largely. He need not worry himself on this score. In future a larger amount of gas will be made from coke under the new heat-unit basis of working; and if he will study Sir Dugald Clerk's address to the Institution of Gas Engineers, the two reports by the Gas Investigation Committee and the paper on the use of oxygen in gas production (as published by us last week), he will find that the industry has within its grasp production efficiencies of between 70 and 80 p.ct., and the prospect of realizing 85 p.ct. These efficiencies are not dependent on load. The gasholders look after that all right. The thing for the men of the electricity industry to realize and recognize is that the gas industry is not standing still.

Three Deaths at 220-volts in a Fortnight.

Reference has frequently been made to deaths caused by electric current at the ordinary voltages of public supply. There was another case recently at the Cerebos Salt Works, at Greatham, near West Hartlepool. Alterations were being made to an electrical installation; and a foreman electrician, named Henry Spurr, was killed. It was assumed that he was using a screwdriver, that his hand slipped, and caught a bare conductor. Mr. S. R. Bennett, one of H.M. Inspectors of Factories, at the inquest, gave the information that this was the third instance in a fortnight of death having been caused by a 220-volt current in the Tees-side district. The case also raised the question of artificial respiration. It was stated in evidence that this was tried for some forty minutes in the case of Spurr. The Home Office are of opinion that artificial respiration should be continued in these cases for two hours; and a notice to this effect is being issued.

Release of Alcohol Supplies.—A correspondent of "The Times" states that the Empire Motor Fuels Committee, as the outcome of deliberations and overtures for which a Sub-Committee are responsible, are stated to be on the point of ensuring the release of several thousands of gallons of power alcohol weekly, in order that extended experience may be gained in the hands of, perhaps, a hundred users. The Committee, with the concurrence of the Department of Scientific and Industrial Research and of the Board of Customs and Excise, are taking steps to obtain and submit for approval the names of would-be users.

NATIONAL GAS COUNCIL.

Meeting of the Central Executive Board.

A meeting of the Central Executive Board of the National Gas Council was held last Wednesday at No. 30, Grosvenor Gardens, Victoria—Mr. D. Milne Watson in the chair.

It was reported that the Coal Mines Department had been interviewed with regard to the position of gas undertakings when the control of supplies ceased. If gas undertakings were unable to obtain sufficient supplies from their contractors, it was urged that the Coal Mines Department should render them assistance. The Council were informed that this work would be relegated to the District Coal and Coke Supplies Committees; and that these Committees were being reconstituted. The Council claimed that the gas industry should have a representative upon these Committees, in order that their requirements might receive special consideration with a view to avoiding supplies of unsuitable coal being sent to gas-works.

The suspension of the Household Fuel and Lighting Order (as from the 7th inst.) was referred to, and the withdrawal of Government control of the distribution and sale of coal. Prices of coal at the pit's mouth are still fixed under the Price of Coal (Limitation) Act.

It was stated that the Coal Controller would receive a deputation from gas undertakings on the 15th inst. [to-day], in order to discuss the position with regard to insufficient stocks of coal. The meeting decided that each District Executive Board should be asked to nominate two representatives on this deputation, in addition to the members of the Central Executive Board.

With regard to the Gas Regulation Bill, it was reported that this was down for second reading that [Tuesday] evening, and proposed amendments which would be moved at the Committee stage were considered.

A letter was circulated from the Institution of Gas Engineers, setting-out the recommendations of the Joint Committee on the Life of Gas-Meters, and advocating new standard sizes of dry meters. In accordance with the request of the Institution, it was reported that copies had been sent to the Secretary of each District Executive Board, suggesting that the matter should be considered by the district.

It was reported that the Council had taken active steps with a view to amendments being moved to the Finance Bill, excluding Public Utility Undertakings from the imposition of the Corporation Tax.

Liquid Purification of Gases.

Some details of the evolution of an original gas-purifier, taken by Mr. C. E. Reese, of Springfield, Ill., from his thesis for the degree of Master of Science in Gas Engineering, prepared in 1915, are given by him in the American "Gas Age," with the hope that some useful ideas may be gained from them by those interested in the liquid purification of gas. The writer says that throughout his study he noticed that ammonia liquor had the property of absorbing hydrogen sulphide. It therefore became a problem to design a suitable machine in which to bring the gas containing the H_2S and the ammoniacal liquor into intimate contact. The means became evident while he was studying how a Fabin grid ammonia absorber could be made more efficient. It occurred to him that holes could be drilled in the boards, making the gas bubble through the liquid. Following up this idea, Mr. Reese designed the H_2S and NH_3 extractor, of which he gives illustrations. The machine consists of a series of specially designed perforated trays in a shell. The liquid flows in at a point in the upper part of the shell, and passes over the series of trays, while the gas flows up from the bottom; the problem in operation being simply that of balancing the liquor column with the gas pressure. The level of the purifying liquor can be regulated to suit the best practice, thus enabling the trays to serve for various pressures. The shell is made in lengths, so that six trays can be caulked in; then another section added, and six more trays placed. In order to re-absorb any NH_3 vapour that escapes, cold water is circulated through the top series of trays; leaving at the tray above that at which the ammoniacal liquor enters. This section would not be needed if ammoniacal liquor was not used. Experiments have shown that a liquor of from 7 to 24 p.ct. of NH_3 by weight will remove H_2S from gas. One of the problems still to be solved is that the machine has no provision for cleaning, except by high-pressure steam and air. If it was attempted to remove the H_2S by NH_3 liquor, some means of supplying a constant strength of ammoniacal liquor would have to be provided. Applications of the machine suggested by the author are for the removal of ammonia, hydrogen sulphide, benzol, toluol, solvent naphtha, and naphthalene from gas.

Temporary Increase of Charges Act.—The most recent applications that have been received by the Ministry of Health for Orders under the Statutory Undertakings (Temporary Increase of Charges) Act are from the Bala Urban District Council, the Bourne Urban District Council, the Festiniog Urban District Council, the Newbury Urban District Council, and the Ossett Corporation.

EMERGENCY CONFERENCE OF THE AMERICAN GAS ASSOCIATION.

From an American Correspondent.

NEARLY two years ago—July 2, 1918—your colums contained an account of the organization of the American Gas Association. It concluded with the following words:

> "Thus, in the midst of the most intense activities for the prosecution of the war, the gas companies have found time to take a step which they believe will improve their opportunity for national service. We are sure our British brethren will watch our new enterprise with great interest, and, if it is successful, will at once try to decide whether under their conditions, a similar strong organization would not produce better results for the industry than the present loose federation represented in the National Gas Council."

Since that time the Association has held its first annual meeting; but what is far more important it has, through the efforts of its efficient full-time staff, been each day proving more and more its right to speak for, and its appreciation of the needs of, our gas industry. This has never been more clearly shown than in the recent appointment of the Emergency Committee, at whose request an Emergency Conference of the Association was held in New York City on Wednesday, May 26.

In convening the gathering of about three hundred managers of gas companies from all over our big country, President Geo. B. Cortelyou urged that every means be employed to show the public the facts about the gas industry. He expressed confidence in the judgment of the public, once it knows the truth. "The economic conditions affecting the supply of coal, oil, and other essential materials, of labour and of the funds required to maintain and develop our properties, are not bogies devised by the industry to secure preferential treatment, excessive rates, or unwarranted returns upon investment."

A representative of the Investment Bankers' Association described the increasing cost of money to gas companies, and how necessary were increased prices for gas to prevent the insolvency of the industry. Mr. N. A. C. Smith, for the Bureau of Mines, spoke of the scarcity of oil suited for carburetted water gas. Then Mr. Philip H. Gadsden, as Chairman of the Emergency Committee, submitted the following statement and programme, which was unanimously adopted:

> The gas industry of the country to-day faces a situation so critical that it demands immediate relief if gas companies are to continue to operate until a permanent solution of their problems can be put into effect.
>
> The Emergency Committee of the American Gas Association has two distinct objects—quick and effective emergency relief, and ultimately the readjustment of the relation of the gas industry to the public on a basis which will insure continued and efficient service hereafter.
>
> For emergency relief it recommends:
>
> (*a*) Priority in shipment of oil, coal, and coke, with preference in allocation.
>
> (*b*) Such immediate and substantial emergency increases in rates as will make possible the continued production and sale of gas, notwithstanding the great increases in the cost of oil, coke, coal, labour, and other items, and which will in addition restore and protect the credit of gas companies pending a permanent solution of the situation.
>
> (*c*) Emphatic protests, through every possible agency and by personal contact, against the present tremendous exports of oil and coal.
>
> For permanent relief it urges:
>
> (*a*) Abolish the candle-power standard.
>
> (*b*) Reduce the consumption of oil by gas companies to the smallest quantity practicable, and readjust the heating standards accordingly.
>
> (*c*) Rates hereafter established should be elastic and quickly responsive to changing conditions of operation.
>
> (*d*) The rate of return allowed on the investment by gas companies should be materially increased, in order to compensate for the decreasing purchasing power of money and, further, to strengthen the credit of gas companies to a point where new capital will again flow into the gas industry.
>
> It is proposed to accomplish the above objects by utilizing all proper agencies for that purpose.

In view of the above, it may truly be said that the gas industry in this country has "found itself," and will from henceforth speak with authority and to a purpose through its truly national representative, the American Gas Association.

German Gas Association.—The last number to hand of the "Journal für Gasbeleuchtung" gives details of the arrangements for the annual meeting of the German Gas Association. It is to take place this year at Bad Harzburg on Thursday and Friday of this week, the 17th and 18th inst., with Herr E. Körting, of Berlin, in the chair. There are to be no festivities, "in view of the seriousness of the times;" but several excursions have been arranged. In connection with the meeting, an exhibition of novelties in gas production, distribution, and utilization, and works' control, will be open, which is expected to contain much of interest both to producers and consumers. Six papers are to be read, and the usual reports of Commissions will be presented.

IMPERIAL WAR MUSEUM AND VICTORY EXHIBITION.

The Gas Section at the Crystal Palace.

No Britisher who is in London, and can spare the time, will neglect to run down to the Crystal Palace, and spend there as many hours as he or she can. The big glass house on Sydenham Hill has been the scene of many exhibitions, but never one such as this, for opportunity and world-shaking events have never permitted it. All the available space—on the main floor and in the galleries—is occupied by samples of implements of modern warfare which were actually in use by the Allies and the enemy, in the four-and-a-half years of war, from the great airships down to the Red-Cross motor ambulances, shattered and begrimed. There are guns of all descriptions from ships and battle fields—captured and exemplifying the might in armaments of the allied nations. There are relics that took part in engagements and adventures that made the world pause to admire what seem to be more than human daring and bravery. There are samples of our own war productions shiny and bright, standing in strange contrast with those similar weapons that have been in actual service, and responsible for——Heaven only knows what. It is a great, grand, and inspiring display, in which history is read, and human effort typified in causes on the one side just, and on the other repugnant to the noblest of human virtues and sentiments. It is not, however, our part to dwell upon these things here. But they will act as a great magnet to the Crystal Palace; and the people will see the wonders which helped to victory.

There is another side to the exhibition. Gas, electricity, oil, and engineering have their sections; and the visitor must not miss these. Descent by the staircases at the back of the great stage will bring the visitor, bearing to the left, to the Gas Section. Here will be seen a small but representative collection of excellently-filled stands demonstrating the diverse modern applications of gas—mainly for domestic purposes, with occasional instances of industrial heating use, and gas-engines of moderate power. The display is peculiarly fitting in these days when the gas industry is about to make a departure to heat units as the basis of manufacturing operation and trading—when we shall be assessing the value of work done by a ton of coal largely in terms of B.Th.U. put in the form of gas into the distributing mains. There is also much evidence as to the success of the efforts of our manufacturers in making provision for the application of gas to any and every purpose for which it is useful in the household, and particularly in the housing schemes. It likewise shows that gas heating and refinement are meant to accompany each other. This is not possible in every room in all old houses; utility sometimes rides supreme over appearance on account of the cost of conversion. But there is no reason, where the expense can be entertained and in all new houses, why utility and refinement should not accompany each other.

South Metropolitan Gas Company.

The South Metropolitan Gas Company are occupying the largest amount of space in the section. The stand is an old friend. We have seen it at the Ideal Home Exhibition. But it is not nearly completed, through no fault of the Company, but (as we understand) through a little difference of opinion between the Company's men and others employed in the building regarding the terms of employment. This is only rumour; it may be wrong. But it matters little, save that it puts what we know will be a good display somewhat behind time. Looking at the stand we can, having seen the fine representation of the ideals of the Company before, visualize what the demonstration will be like. There will be the "Metro" gas-burners and gas-fires, with their dainty fittings and surroundings—all showing that art and utility can with gas be the closest friends. There will be the "Metro" cookers; and if plans are carried out, there will be a demonstration of the care and exactitude bestowed upon the manufacture of "Metro" burners.

South Suburban Gas Company.

The section would not have been complete without the Company had been there whose gas is supplied to the Crystal Palace, and who took such a prominent part in showing the illuminating merits of high-pressure gas at the Palace at previous famous exhibitions. Their stand occupies a prominent central place. It is spacious; and it is divided into two parts. One part represents a furnished room, fitted with a three-armed inverted centre light, surrounded by a pretty shade; and two side bracket inverted lights. In the fire-place there is one of Richmond's "R.H.D." fires. On the other part of the stand, there are demonstrated lighting, heating, and hot-water supply. The first public display is made here of the new "Therm" upright burner—this the "Minor" size, which is intended to take the place of flat-flame burners (without altering fittings) with any grade of gas. The Company are showing the burner on an oak stand. There is a six-light cluster on one bracket, and two arms at the side show the burner with midget globes, which suggest that this burner will be adopted for all sorts of uses—for, fitted with galley and globe, it is very ornamental, besides serving the useful purpose of displacing flat-flame burners in passages, corridors, lavatories, bath-rooms, &c., where a small light from one burner will suffice, and save the difference between a consumption of 1 c.ft. and 5 or 6 c.ft. per hour. The virtues of the burner were set out in an article in the "JOURNAL" for May 25; and visitors can here judge for themselves whether the claims were justified. The same burner for larger consumptions is, we believe, being delayed for a time by the difficulties that are in these days generally experienced in manufacturing new productions. There are large inverted burners for the general lighting of the stand; and there are gas-fires, with

which are identified such well-known names as Arden Hill, Richmond, Main, Wilsons and Mathiesons, Davis, Fletcher, Russell, & Co., and Cannon. There is the Parkinson cooker, which the Company hire out in three sizes. And hot water supply is being demonstrated by Wright's B.Th.U. boiler, with a 25-gallon cylinder, and thermostatic control. There are also seen the Richmond "Blackpool" boiler, and the Davis "Shamrock" geyser. It is a good and useful display for attracting the attention of the Company's consumers.

Sidney Flavel & Co., Ltd.

We turn to the neighbouring stand of Sidney Flavel & Co., Ltd., of the Imperial Works, Leamington. The eye is at once engaged in examining some choice gas-fire suites—mantels, fires, curbs, dogs, everything complete; and the specimens are suitable for drawing or dining room. These things are not shown to-day as at one time. Proper installation is what is now exemplified. We admire the fine castings and finishes—the styles are chaste; whether it be the "Ram's Head," the "Adam," the dog grate, or any other style. There is a type for any decoration, and any taste. There is also shown a sample series of ordinary fires with enamel black, armour bright, and other finishes. A little fire with five bijou radiants, and using only 10 to 12 c.ft. an hour, invites attention. This is a fire which can be moved from room to room, and be connected up by flexible tube. Specimens are seen of the "Imperial" cooker, fitted in one case with hood (white enamelled interior) and plate-rack. The sunk taps are noticed; and the fact that cross bars (which are wasteful in their dispersion of heat by conduction) have been dispensed with, and the boiling-rings are left without obstruction between flames and utensil, is remarked. There are grillers on view; and the "Utility" gas hot-plate will not escape notice. There is only one burner underneath, so that it is economical, with the provision afforded for four normal sized utensils on the top. If required, the circular plate over the burner can be removed, to give direct contact of flame with the utensil above.

George Glover & Co., Ltd.

This firm occupy the adjoining stand. They are enlightening the public as to the construction of gas-meters, by exhibiting meters complete and in different stages of manufacture. The interested visitor will be surprised at what the tin-plate box which he knows as the gas-meter contains. He will find that its internal organism is a structure of many parts, beautifully and carefully designed and made. In a glass case there are separately shown all the parts of a three-light slot meter. If the visitor is a man of leisure, he may like to ascertain the total number by counting them; but we had not the time to spare. There is a 150-light meter on view; and it shows its capacity for registering down to the consumption of a single burner, using about 6 c.ft. an hour. It is the care exercised in the manufacture of meters that ensures accurate registration. Naturally, Glovers and Richmonds being old associates, it is not surprising to see two examples of the excellent work in gas-fires of Richmond types. One is a dull-nickel "Renaissance," and the other a "Louis" art copper fire—respectively fitted in a Sheraton mahogany mantelpiece and in a satinwood mantelpiece, both being beautiful specimens of work.

Parkinson Stove Company, Ltd.

If anyone wants to see how to arrange for an all-gas kitchen, he or she must visit the Parkinson Stove Company's stand. One of the exhibits ought to have "Multum in Parvo" printed above it. In a compact space, there is utility, comfort, convenience all combined; and it shows how gas appliances enable space to be conserved. On one side is the new "Stechford" cooker with ample ventilated space above for making full use of the hot-plate. On the other side is a gas-fire; on a shelf above the gas-fire is installed an incinerator for refuse destruction; and above this again is one of the new "Cottage" water-heaters, which has in effect two boilers in one, with simple control, so that for small quantities of hot water the little boiler is used, and for large quantities of water and circulation over the house the entire arrangement is brought into service. This water-heater was described in the "JOURNAL" some short time since; and we are informed it has become very popular in connection with the housing schemes. All these appliances have vent for the products of combustion into the kitchen flue. But this is not all. Alongside the "Cottage" water-heater, and receiving heat from it, is an airing or warming cupboard. Thus there is no waste space in this labour-saving equipped recess. To demonstrate the heating capacity of the "Cottage" boiler, a sink and bath have been fitted. There are also on view other water-heating appliances, including a circulator. A representative display is made of gas-fires in high-grade finishes; and fitted are samples of the "Conrad" fire, which name signifies convection and radiation. The fire has excellent radiating efficiency; and it has been designed to impart to the room a larger amount of convected heat than is ordinarily the case, and this will be remembered from the description of the fire that was published in our columns, and regarding the claims for which there was some controversy. The fires give an excellent account of themselves. One is fitted in a brown tile surround; and it is a highly attractive combination. Of course, it can be obtained in any finish desired. Here is a novelty. A fire fitted with a couple of dogs—one is a dummy; the other is intended for active service. This is not apparent, however, until the top is swung over; and then there is exposed a small boiling ring. The same idea has been incorporated in a little portable pedestal, which can be moved, with a flexible connection, anywhere that it is wanted for boiling water or keeping it hot. Radiators, a circular factory fire, and cookers are seen. There is a combined display of Parkinson and Cowan slot and ordinary meters. A good show is made of lanterns and cluster burners for inverted mantles. And last but not least in these days, a Beasley recording calorimeter is included in the collection. The stand gives an excellent representation of the modern applications of gas; and it is an effective practical demonstration.

James Keith and Blackman Company, Ltd.

The name is sufficient. The applications of high-pressure gas are here shown. Lighting and laundry work are to be demonstrated to the public; and this is always popular. There will be seen Keith high-pressure laundry and pressing irons of various sizes, together with shirt and collar machines, in operation, adapted for use on the Keith high-pressure gas system. A Keith "positive" rotary compressor will be working, supplying the high-pressure gas to both the laundry irons and machines, as well as the lamps on view.

William Edgar.

At the time of our visit this stand was not open to the public; but the catalogue assures us that behind the screen there is considerable interest. Water heating is demonstrated. There is the "Instanter" geyser (in two sizes), with take-out interior, and automatic control valve. The "Waterloo" geyser is shown, for which the control is of the interlocking type; and so are the No. 0 and No. 1 "Blenheim" hot-water circulators. The exhibit would not be complete without the well-known "Blenheim" patent gas-fire. Small labour-saving devices for the home will be seen—such as the "Brentford" gas-fire lighter, the three-in-one saucepan, known as the "Nest-o'-Pans," and the Edgar flashing pipe-lighter.

Stimex Gas-Stove Company, Ltd.

There is no doubt that there is a growing favour among the public for gas-cookers with externally heated ovens. The Stimex Company have here a fine collection of their ovens and ranges, in which the principal feature (apart from the structural details) is this external heating and an enclosed oven. Some people have their doubts as to whether or not there is a saving of gas by external heating; but we are assured this is the case. The Company's "A1" range is a combination which is intended to take the place of an ordinary kitchener. It not only does all the cooking, but it provides hot water for the house-circulating system, has an open fire for airing and warming, and a separate hot chamber for plate-warming. The ovens are worth inspection. There is also on view a bath and lavatory basin, supplied with hot water from a Stimex circulator.

Thermal Syndicate, Ltd.

On this stand there is a fine exhibit of the "Vitreosil" (pure fused silica) gas globes and bowls for semi-indirect lighting, as well as globes and protectors for domestic and street lighting (high and low pressure). The virtue of the material is that it is unbreakable by heat or sudden cooling.

Ewart and Son, Ltd.

One could spend a long time on this stand in witnessing the highly efficient working of the fitted geysers and other water-heaters. Four baths and lavatory basins or sinks are the scenes of good demonstration when visitors are about. There is no deception. Water-taps are turned, gas-jets spring into lively action, and steaming hot-water issues instantly. A central feature is a large "Califont," 45 B, which gives 8 gallons of hot water per minute. When water is not being drawn, the jets are reduced to the size of pilot lights; but on hot water being required, the flames immediately rise into full action. This heater (which is made in different sizes) will supply water to all parts of a house. Special attention is drawn to the "Industria" water-heater, which is fitted with a two-way cock, so that very hot water can be had for sink use, or water at a lower temperature for the bath. The boiler is fitted with two tanks—1 gallon and 15 gallons respectively. If a small quantity of hot water is required, the lever is switched-over to "sink;" and this brings the 1-gallon tank into action. Within five minutes, 1 gallon of boiling water can be obtained. By switching the lever over to "bath," in twenty to twenty-five minutes, 16 gallons of hot water can be secured; and it is at a sufficient temperature to allow (if required) an equal quantity of cold water to be added—thus giving a bath of about 30 gallons of water. Fitted with a ball-valve, there is assurance that the tank will not run dry. It is economical and cheap. There is the "Ever Ready" boiler for making tea; and we listen to a good account of one of these that did heavy duty throughout the war at the free buffet at Waterloo Station. During the whole time, it never went out of action. Introduction is made to the "Royal" geyser, which is a water-heater of modest cost, but highly efficient. It has interlocking gear, and discharges its service at the rate of 2½ to 3 gallons per minute. So we go on, inspecting geysers and boilers of all kinds; and some in finishes that need no cleaning.

Thomas Potterton.

The name of Potterton in the gas industry denotes high-class work, and efficiency of the same order, in gas-heated water-circulating systems. It is a fine specimen display that we see here of at least a dozen varieties of "Victor" boiler equipments—among them being a working example of automatic gas-heated water supply for domestic purposes. Thermostats (both water-controlled and air-controlled types) governing the gas consumption are shown in operation. The water-controlled type is used with boilers supplying hot water to baths, sinks, lavatory basins, &c., while the air-controlled type is for use with boilers for warming offices, &c. There is on the stand an interesting example of a complete gas-kitchen equipment. No one will pass this stand without further investigation.

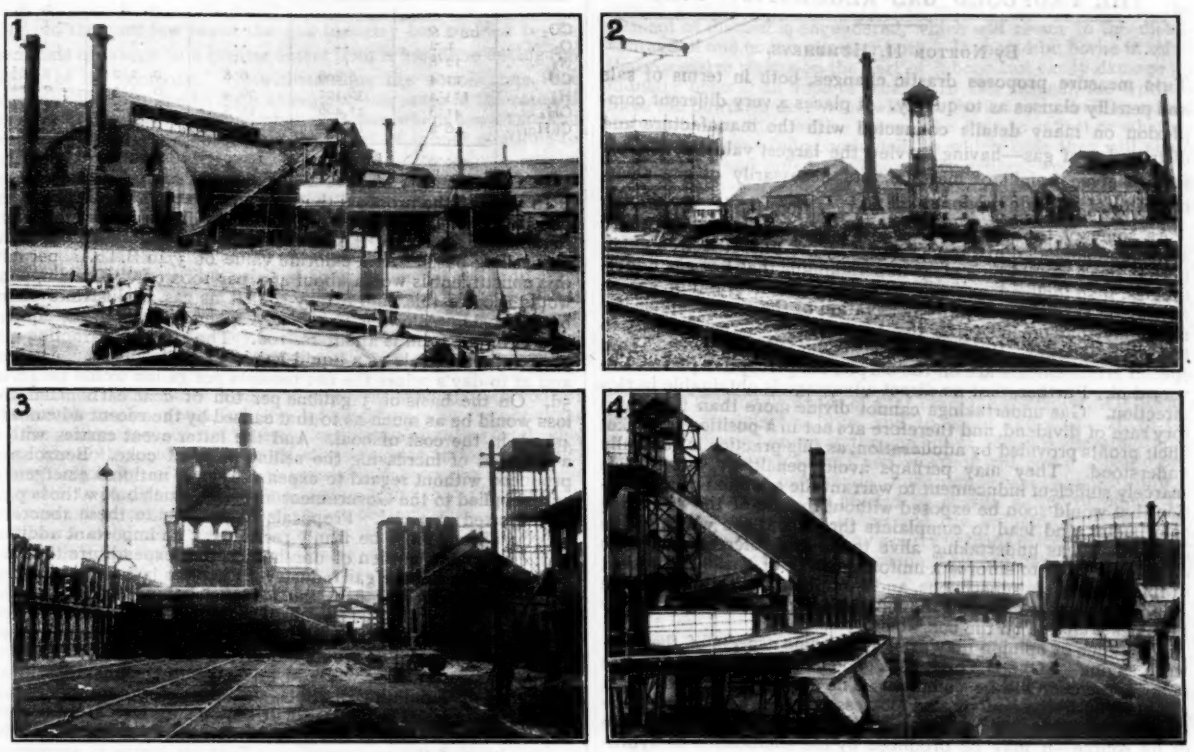
National Gas-Engine Company, Ltd.

The Company make a fine display. The exhibits comprise a six-cylinder vertical engine, suitable for working with petrol, oil, or town gas, and capable of developing 60-B.H.P. maximum, at 650 R.P.M. The engine is specially constructed for dynamo driving. A gas-engine of the "O" type is of 14 B.H.P. maximum. It is fitted with magneto ignition, and is suitable for working on either town or producer gas (speed 260 R.P.M). A similar engine is of the "R" type. It is of 26 B.H.P.; and the speed is 250 R.P.M.

Crossley Bros., Ltd.

The collection of engines on this stand include a 28-B.H.P. (normal load) town gas engine, and one of 8-B.H.P. These, it is claimed, represent "the latest, most modern high-class engines for electric lighting." There is also a 4-B.H.P. normal load horizontal engine, which "meets the demand for a high-class moderate speed engine for general industrial or electric lighting purposes."

THE GAS INDUSTRY IN JAPAN.



1. FUKAGAWA. 2. SHIBA.
3. SUNAMURA. 4. SENJU.

TYPES OF JAPANESE GAS-WORKS.

THE information given in the following article with regard to the works of the Tokyo Gas Company and the Okayama Gas Company, has been elicited in an interview with Mr. M. Mizuta, the Consulting Engineer to both undertakings, who is at present on a visit to this country.

TOKYO GAS COMPANY.

This Company has five works. The Shiba works are situated at Tokyo Gulf, on the seashore, and have six benches of horizontal retorts, each bench with nine retorts; the charging and discharging being effected by De Brouwer machines. The total capacity is 1 million c.ft. per day; and the gasholder accommodation is equal to 24 hours' make. Seven-hour charges are worked.

The Senju works are at the north end of Tokyo City, on the Sumida River. There are seven benches of inclined retorts, in which are 57 retorts; the total capacity being 800,000 c.ft. per day. These retort-benches were supplied by the West's Gas Improvement Company. There are also at the works 24 benches, consisting of 240 horizontal retorts, of a capacity of 3½ million c.ft. per day; the charging and discharging being by De Brouwer machines supplied by Messrs. W. J. Jenkins and Co. The three holders have a total capacity of 5 million c.ft.

The Fukagawa works are at the east of the city, and are on a tributary of the Sumida River. Gas is made here by means of inclined, vertical, and carburetted water-gas plants. The inclined retorts comprise forty benches, with 360 retorts, having a daily capacity of 5 million c.ft. There are seven benches of Glover-West verticals, containing 56 retorts, with 1¾ million c.ft. capacity. The water-gas plant is of the Humphreys and Glasgow pattern; the two sets being of 1 million c.ft. per day each. There are two holders, of a total capacity of 2,150,000 c.ft.; but gas is also transmitted from the works to a central holder station, at a pressure of 15 lbs. per sq. in.

The Omori works are outside the city, and, like the Shiba works, are on the Tokyo Gulf. The carbonizing plant is on the Koppers chamber system. There are 36 chambers of a daily capacity of 3½ million c.ft.; the gasholder capacity being of a like extent.

The Sunamura works are also outside the city, on the east side, facing a branch of the Sumida River. The carbonizing plant consists of Solvay chambers, of a capacity of 550,000 c.ft. per day. The plant is intended primarily to supply metallurgical coke; the surplus gas being stored in a holder of 600,000 c.ft. capacity.

The President of the Company is Dr. T. Ishiwatari; the Managing Directors, Mr. Y. Isobe and Dr. R. Mitsugi; the Chief Engineer, Mr. N. Osawa.

For general purposes, gas is supplied from the works at a pressure of 5 or 6 in; but it is also sent to a central storage station at pressures of 15 lbs. and 5 lbs. per sq. in. from the Senju and Fukagawa works. At the same time, a boosting system is used in many places.

The following figures show the growth in sale of gas during the last four years:

Sale of Gas.

	C Ft.
1916	3,205,790,600
1917	3,522,116,600
1918	4,300,817,000
1919 (first half year)	2,382,088,000

There is, as will be seen, a large consumption of gas for industrial purposes; the daily average supply over the periods named being:

Gas Used for Industrial Purposes.

		Daily Average C.Ft.
1917	first half year	962,970
	second	1,207,140
1918	first	1,440,500
	second	1,533,490
1919	first	1,627,480

The nominal capital is 45 million yen, and the paid-up capital 38 million yen. At to-day's rate of exchange, a yen represents 2s. 6d. The sliding-scale system was adopted nine years ago, and worked well then; but war conditions and high prices have adversely affected it.

With the introduction of electricity into Japan, the use of gas for lighting decreased; but consumption has continued to grow for all other purposes, and the future is regarded with every confidence. Gas is employed universally for cooking; and there are great numbers of small industries which also make good use of it. Coal is very dear now—about 60s. per ton for Japanese coal.

The increasing demands for gas have called for a scheme of extension of works; and the conditions are the same with the Osaka, Nagoya, Kobe, Okayama, and other Gas Companies of the country.

OKAYAMA GAS COMPANY.

The City of Okayama, located some 110 miles west of Osaka, is a large and busy commercial place, with a population of about 100,000. The works were completed and put into operation in November, 1910, and were intended in the first place for an output of 100,000 c.ft. of gas per day. With increasing demands, however, the scheme had to be extended in 1916 to cover a daily output of some 250,000 c.ft. Then came the time of high prices and other difficulties; and the Company now supply about 220,000 c.ft. per day.

The gas manufacturing works are situated at Amihama, two miles from the centre of the city. They are provided with eleven benches of seven manually charged horizontal retorts. Gas is stored in two holders, of 100,000 c.ft. and 210,000 c.ft. capacity. There is a high-pressure plant.

The President of the Company is Mr. M. Omori; the Chief Engineer, Mr. K. Aoe; and the Manager, Mr. S. Nakanishi. The paid-up capital is 500,000 yen; and the dividend distributed for the first half of 1919 was at the rate of 6 p.ct.

IMPORTANT CONSIDERATIONS SUGGESTED BY THE PROPOSED GAS REGULATION BILL.

By NORTON H. HUMPHRYS.

THIS measure proposes drastic changes, both in terms of sale and penalty clauses as to quality. It places a very different complexion on many details connected with the manufacture and distribution of gas—having in view the largest value obtainable from a given weight of material, not necessarily of gas alone, but of total saleable products.

As some of these exhibit a relationship to the extraordinary statements included in a report issued by the Fuel Research Committee, there should be a clear understanding that few gas undertakings, if so inclined, are able to keep a special brand of gas on tap, to be turned on for the delectation of the gas examiner immediately that official turns the corner of the street leading to the testing-station. If, after a few visits, he fails to recognize that special arrangements are on the carpet, his perceptive powers are very dull. Further, that no direct advantage is obtainable in this direction. Gas undertakings cannot divide more than the statutory rate of dividend, and therefore are not in a position to pocket illicit profits provided by adulteration, as this practice is generally understood. They may perhaps avoid penalties; but that is scarcely sufficient inducement to warrant the adoption of a deception that would soon be exposed without the aid of the recording calorimeter, and lead to complaints throughout the whole of the district. A gas undertaking alive to its own interests needs no outside policing to enforce a uniform quality of gas. Enactment in this direction is superfluous, and resembles the candle and the sulphur clauses in causing unnecessary expense that eventually becomes a charge on the consumer.

Difference of opinion may exist as to some aspects of the well-worn saying—"One B.Th.U. is as good as another." But on one point agreement will be common. The gross calorific value of a gas is equal to the sum of that possessed by the several combustible constituents. A unit is a unit, irrespective of the nature of its source—it may be produced by the combustion of hydrogen, methane, or other combustible gas. There is only one direct standard of calorific value, and that is the total, commonly known as the "gross." This inaccurate expression has been adopted as a contradistinction to "net" calorific values, which are to some extent matter of opinion. In view of recent utterances before a Parliamentary Committee, some amusement might be expected if barristers or accountants were called upon to oppose a "net" calorific value.

The only definite unit by which gas has up to the present day been sold is that of the cubic foot. Certain limitations have been set in respect to quality and purity. But the several constituents have all to be paid for at the current price per 1000 c.ft. The gas company receive this amount, no more and no less, for equal volumes of carbon dioxide, nitrogen, hydrogen, methane, or benzene. If the Gas Regulation Bill is passed as established law, each constituent will have a value corresponding to its calorific power. Three times as much will be received for methane as for hydrogen, bulk for bulk, and nothing for non-combustibles. In respect to these, there is a minimum that cannot be further reduced; and it is quite possible that gas containing a large proportion of inerts may be preferable all round. The penalization of matter that will not be chargeable in any form is superfluous and, in some respects, anomalous.

It will constitute a gross injustice so long as the gas undertaking is compelled to buy coal irrespective of quality, and to pay the full Government controlled price for worse than useless dirt and moisture. If the price for gas on a combustible basis should prove a step towards a similar enactment in respect to coal, it will meet no opposition. But gas undertakings should not rest satisfied until buying and selling are established on equal bases. The handling and distribution of inerts will not be affected by a change of selling basis, but will continue to cost exactly the same as a similar bulk of valuable combustibles. Granting that they cost nothing to begin with, they carry the same bulk charges. A pure combustible gas will be paid for at exactly the same rate as the same gas diluted with 50 p.ct. of inerts. But in the first case there will be only half the bulk to deal with, which represents a large saving both on first outlay and on working expenses. The supply of inerts in excess of the minimum above indicated can only be justified by compensating economy in manufacture, additional facility in distribution, or as being more acceptable to consumers to an extent that will show on the sales.

As a convenient illustration, we may take a 500 B.Th.U. gas, of which 200 c.ft. (100,000 ÷ 500) are equivalent to 1 "therm." The approximate composition, calorific value, and cash receipts for each constituent are shown in the following table. The commercial value possessed by each constituent is a matter of simple calculation, *minus* an even-bulk charge for handling and distribution that will vary according to circumstances, but for the present purpose may be taken as 1s. per 1000 c.ft.

As a percentage on the value charge, the standing costs vary inversely with the calorific value. They range from 2 p.ct. for benzene to 25 p.ct. for blue gas. The point is of importance in connection with the distribution of low-quality gases.

—	Cubic Feet per Therm.	Calorific Value.	Value per Cent.	Commercial Value.	Value per 1000 c.ft.
				s. d.	s. d.
CO_2 . .	3·0	..	..	..	— 1 0
O_2 . .	1·2	..	..	..	..
N_2 . .	12·8	..	..	..	..
CO . .	21·4	6,806	6·8	0 1·0	2 10½
H_2 . .	113·4	36,401	36·4	0 5·5	2 10½
CH_4 . .	41·8	41,466	41·5	0 6·2	11 4½
C_nH_m .	6·4	15,360	15 3	0 2·3	30 0
	200·0	100,033	100·0	1 3 0	..

In view of the proposal that gas undertakings should be compelled to extract benzene from the gas, a digression is made here to admit of examining the effects of such an enactment under the new selling basis. At a calorific value of 3740 B.Th.U. per c.ft. this constituent is worth about 46s. per 1000 c.ft. The company would receive this sum if they sold it as gas, exclusive of distribution costs. Allowing 40 c.ft. of vapour per gallon, the equivalent in liquid form is about 1s. 10d. The cost of extraction and preparation for sale as a liquid has been quoted at 2s. per gallon, and at to-day's prices the net receipts per gallon would be 4d. or 5d. On the basis of 3 gallons per ton of coal carbonized, the loss would be as much as to that caused by the recent advance of 4s. 2d. in the cost of coal. And the latter event carries with it a prospect of increasing the selling price of coke. Benzol was produced without regard to expense to meet national emergency, and supplied to the Government at prices much below those paid on imported material. Proposals to perpetuate these abnormal war conditions must be firmly resisted as an important addition to the enormous burden of unremunerative expenditure that has been forced upon the gas industry during the last few years, and which will be increased by the new restrictions included in the Gas Regulation Bill. They also open the way towards a new species of impost. If benzol is subsidized at the expense of gas, other lines of chemical manufacture may follow suit.

The pressure clause will add to distribution difficulties in all straggling or undulating districts, and will necessitate substantial increases in regard to district distribution stations. But the most important innovation is the introduction of regulations as to the composition of the gas supplied. That on inerts is an accomplished fact; carbon monoxide is to follow; and methane is under consideration. Such restrictions may be so applied as to render the privilege of declaring a "value" of little use. There are reasons why the maximum calorific value should not exceed (say) 550 B.Th.U. A gas containing 15 p.ct. of inerts, 20 p.ct. of methane, and 65 p.ct. of blue, will be worth 400 B.Th.U. A working margin of (say) 10 p.ct. would be necessary, which practically limits the "declared" value to within 450 to 550 B.Th.U. The restrictions on the percentage of carbon monoxide do not necessarily affect the calorific value, but are concerned with several other important items bearing on the lowest practicable cost per therm.

If the average indications of a recording calorimeter are taken as the basis of charge, the undertaking will be paid for the whole of the B.Th.U. sent out. But the cost of a recording calorimeter, including housing, will be a heavy tax on the smaller class of statutory undertakings at a time when many are already under financial embarrassment. If the declared value fixes the selling price, then the company will not be paid for the working margin, but will be in the same position in this respect as now.

Restrictions on the composition of gas may have such a far-reaching effect that they should, if necessary, be based on something very much more substantial than the predilections of one or two chemists. There should be uncontestable evidence that they would really be of tangible advantage to the consumers.

The Need of Publicity.

The need of publicity was emphasized by Mr. Charles W. Hoy (the General Manager of the New Jersey Gas Company), in his Presidential Address to the New Jersey Gas Association. He said that 90 p.ct. of the public do not know what costs enter into the production of gas. They are anxious to become acquainted with all the facts regarding public utilities, so that they cannot be easily misled by the misstatements of political demagogues. They would like to know first-hand from the gas companies just how the increase in the cost of labour, coal, oil, and other materials is going to affect the service of the utility company. The consumers seldom see the officials of the gas companies; and the employees with whom they come in contact are few in number. The public should know that during the last four years the gas companies have had to contend, on the one hand, with wages and the cost of materials increasing by leaps and bounds, and on the other with only a small increase in the charge for services rendered. This condition resulted in bringing some gas companies almost to the point of bankruptcy; and many have not earned dividends. The market for gas securities has been impaired so that it is almost impossible to obtain new capital with which to make the improvements demanded by growing communities. On every hand, the presence of increased expenses threatens the welfare of all the agencies upon which the public depend for so many comforts and necessities. Some special effort must be made by gas companies so that this condition can be brought to the attention of the public in general.

LABOUR AND THE GAS INDUSTRY.

By THOS. NEWTON.

DURING the past few years, the gas industry has yielded to the demands of labour to a greater extent than it has done during the whole of its existence. Notwithstanding the concessions that have already been made, both as regards increases in the rates of pay, and reductions in the number of hours which constitute the working week, fresh demands on the part of labour continue to be made from time to time. The situation, which is both serious and perplexing, necessitates a fair amount of clear thinking, and much calm and dispassionate consideration. Probably the most significant fact which emerges at the present juncture is that those who take it upon themselves to make the demands think very little, and care less, as to whether the industry is in a position to grant them. This spirit of indifference to the industry's welfare makes the subject bristle with difficulties.

In appraising the value of the demands which occur with alarming and increasing frequency, it should be borne in mind that they are not always made by the actual employees affected. Neither are they all made with the unanimity which is so very blatantly advertised. Oftentimes a line of policy is absolutely forced on the members of a given industry by outsiders, who are oblivious to the seriousness of our present economic situation, and who care for nothing so much as an effective pose in the limelight. The "solidarity of labour" is proclaimed from the housetops in order to inspire courage; and, acting upon the principle that "silence gives consent," the workers are committed to a course of action of which they do not approve. Frequently they remain inarticulate, on the off-chance of gaining further concessions. A growing spirit of jealousy appears to prevail among some paid officials in the trades union ranks; and this affects a number of workers in different industries. This spirit of jealousy finds expression in a policy of emulation; and this is responsible for much unrest. If the Dockers' Union, for example, gains a certain concession, this immediately provides the necessary incentive; and other unions, in turn, seek to emulate its success. Otherwise, there would be too much relative disparity. What is true of the Dockers' Union is also true of the Miners', the Railwaymen's, and the Gasworkers' Unions. Indeed, the influence of one single concession to-day extends right through the whole gamut of industry, and prices of all commodities rise accordingly.

THE CLAIMS OF THE WORKERS.

The workers naturally claim that, since their labour is their only commodity, they have a right to sell it in the best market, and thus obtain the best price for it. This claim is all very well so far as it goes; but it ignores the fact that the workers are also consumers of other commodities. Any policy, therefore, which has the effect of unduly increasing the prices of these other commodities cannot fail to be antagonistic to the best interests of the workers. There is a certain definite economic limit to the value of any labour, beyond which he who would avoid disaster cannot go. In spite of all that may be stated to the contrary, there has undoubtedly been a great uplifting in the workers' standard of living. Things which formerly were considered as luxuries are now claimed as necessaries. But the former contentment has given way to discontent, excitement, and general unrest. Increased wages are now periodically demanded as a matter of course, and (such is the pace) a reduction in the number of hours which constitute the working week, more holidays, and higher rates for overtime are demanded concurrently. The number and extent of the demands which are made from time to time render the conduct of business exceedingly difficult, if not impossible. It almost appears as if some were deliberately intent on "rocking the boat" so as to produce a catastrophe. In pre-war days, even one of the many demands with which the industry is confronted would have provided sufficient cause for a large industrial conflict.

It cannot be gainsaid that honest endeavours have since been made to ameliorate the conditions and lot of the workers, but without avail. The present trades union leaders are in too great a hurry to produce the social and industrial millennium without sufficiently appreciating the economic disturbances involved. There is half a suspicion that industrial upheavals are being engineered to serve ulterior political purposes. Frequent and oft-recurring demands for increased wages and other concessions can only aggravate the evil from which we are all suffering. The continuance of this policy will certainly increase further the prices of all commodities. It will also restrict consumption, and produce such unemployment as will render nugatory most, if not all, of the concessions which the workers have hitherto obtained.

THE CLAIMS OF THE EMPLOYERS.

Just as the workers have staked-out their claims, so also have the employers; but the latter have much to learn from the former concerning the art of effective publicity. It will doubtless be conceded that capital (which represents accumulated savings) is entitled to a fair return from the industry in which it is employed. In the gas industry, not only is this fair return denied in the existing state of affairs, but the capital itself is badly depreciated. In some cases the capital invested represents about one-half of what it did in pre-war days. And when the purchasing power of the reduced dividends is taken into consideration, it will readily be understood how great is this depreciation. In the gas industry, labour has appreciated, while capital has depreciated; and this should be thoroughly understood and emphasized by those who are entrusted with negotiations. Unless both the capital and the labour employed in industry can receive mutual benefits, the element of discord is engendered, which will re-act to the disadvantage of one or the other, or both. It should be borne in mind that excessive claims on the part of labour can easily damage an industry beyond all hope of recall. In this respect, the workers have the power to determine whether the industry shall be ruined (in which case they will be among the first to suffer) or whether it shall be successfully conducted (in which case they will share the benefits, and thus contribute to the general welfare).

An enormous responsibility rests to-day on the shoulders of labour, for they can exercise the stabilizing effect on industry which is so urgently needed. So far as the gas industry is concerned, capital has made far more sacrifices than labour; and this fact should be well digested by those who have the power to imperil its future progress. Employers therefore claim that reason and tolerance should be exercised by the workers in all their deliberations. They also ask that the industry should be given a fair chance to get on its legs again after the ravages of war.

A FEW PRACTICAL SUGGESTIONS.

Before making demands of a far-reaching character, it is always advisable to reflect a little, and to count the cost. Have the workers reflected on what the upshot of this ceaseless agitation and unrest is likely to be; and where it will end? Steady progress has already been made; but there is real danger in forcing the pace too much. It is absurd to pursue a line of policy the effect of which will be to cripple the industry and adversely affect all engaged in it. Why not try to bring prices down, instead of penalizing the industry in which they are engaged by forcing prices up?

A measure of mutual confidence and trust is badly needed. There has been far too much suspicion in the past; and it is a strange commentary on our proceedings that employer and employed only get in touch through their respective organizations when some haggling process is about to begin. There is room in the gas industry for all at present engaged in it; but there must be no "claim jumping" by one section to the detriment of the whole industry. This could only end in industrial suicide.

The gas-workers should understand that their industrial well-being is wrapped-up in the fortunes of the gas industry. If the industry is crippled by hasty and ill-conceived action, the gas-workers will inevitably suffer as a direct consequence. The suffering may not follow the action immediately; but it is sure to follow it ultimately.

It should ever be remembered that there is a community of interest among all those engaged in the gas industry; and if all would get together with a view to promoting the industry's welfare, a brilliant and successful future would speedily become an assured fact.

Three-Part Gas-Rate in Ottawa.

The principle and effect of a "three-part rate" were described by Mr. H. L. Doherty, in a paper which he read at the annual meeting of the Natural Gas Association of America. Prior to the installation of this new arrangement, the Ottawa Gas and Electric Company were supplying natural gas at a flat-rate of 80 c. per 1000 c.ft. The three-part rate brought into force on Jan. 1 consists of: A customer charge of $9 per annum, payable in equal monthly instalments; a demand charge of 32 c. per annum per cubic foot of maximum hourly demand, payable in equal monthly instalments; and a consumption charge of 40 c. per 1000 c.ft. of gas consumed. After the adjustment of his appliances, each customer chose such a maximum demand as, with the advice of the the Company's service department, he determined was necessary to supply his need. An "Empire" limiting meter was fixed on the service, to restrict the flow of gas so that the customer in one hour secures only the number of cubic feet of gas for which he pays a maximum demand. The author said that the reduction of leakage which can be made without the expenditure of anything for main repairs will amount to about 30 p.ct. This follows the installation of the limiting meters on the services of the customers —reducing their maximum demands, and thereby reducing the pressure that it is necessary to carry in the mains. By the three-part rate, the consumer is brought to appreciate his direct financial interest in gas conservation. In their surveys, the Company have found cooking ranges consuming as much as 106 c.ft. per hour; while it has been proved practicable to cook meals for twenty people with a demand of 30 c.ft. an hour upon identical appliances properly adjusted. Under the new rate, the difference in the annual demand charge between these two cooking-ranges, one properly the other improperly adjusted, would be over $24. The consumer also learns the saving which he would make in the consumption charge with the change in efficiency. The average demand per customer of 1962 consumers prior to adjustment was 118 c.ft. per hour; while now, with the limiting meters, the maximum demand that can be placed on the system by the same consumers averages 58·4 c.ft. per customer.

The wedding took place on the 5th inst. of Mr. Fred Chadderton, the Gas and Water Manager to the Barrow Corporation, to Miss Minnie Whittle.

WALES AND MONMOUTHSHIRE DISTRICT INSTITUTION OF GAS ENGINEERS AND MANAGERS.

Half-Yearly Meeting at Brecon.

A very enjoyable day was spent last Thursday by some forty members of the Institution amid the lovely scenery in which the pretty little town of Brecon is situated. A meeting in such a spot could hardly fail to be pleasant—particularly when accmpanied by such hospitality and cordiality as were extended by the Directors of the local Gas Company. For many members it meant a considerable railway journey; and, taking this into account, the attendance was distinctly gratifying. Unfortunately, there were several unavoidable absences—and these included the President, Mr. A. J. Bond, of Aberavon, in whose stead the chair was taken by Mr. J. H. Canning, of Newport, the President-Elect. Mr. H. D. Madden, of Cardiff, who had contributed a paper, and Mr. T. C. Kirk, the Chairman of the Brecon Gas Company, and the Mayor, were others whose absence was much regretted.

The meeting was held in the Guildhall; and when the members had been called to order,

The Hon. Secretary (Mr. Octavius Thomas, of Pentre) said that, in the absence of Mr. A. J. Bond, the President, he had to propose that Mr. J. H. Canning, the Senior Vice-President, take the chair; and this was agreed to.

Words of Welcome.

Alderman David Powell (Deputy-Mayor of Brecon) said he was present in a dual capacity. He happened to be a Director of the local Gas Company; but primarily he had to offer to the members the apologies of the Mayor for his unavoidable absence on a well-earned holiday. On his behalf, he offered them a very hearty welcome to the historic town of Brecon. He understood that this was their first visit, but felt sure they would be so favourably impressed that it would not be their last. There was perhaps not a great deal to show. They had no big works or mineral districts immediately round Brecon; but they could not fail to be charmed with the natural beauty of the surroundings, and the purity of its air—and of its gas as well.

The Chairman, in returning thanks, remarked that the absence of local industries would be a refreshing feature, so far as most of them were concerned.

A Vote of Condolence.

On the suggestion of the Chairman, the members, by silently rising in their places, expressed the sympathy they felt with their old friend and fellow-member Mr. Dyer, of Bridgend, in the death of his son.

Minutes of the Last Meeting.

The Hon. Secretary then read the minutes of the last meeting, and a letter from Mr. T. C. Kirk, the Chairman of the Brecon Gas Company, regretting that a business engagement had called him away from the town.

New Members and Students.

The following new members and students were elected, on the proposition of Mr. W. C. Jackson (Neath), seconded by Mr. J. Mogford (Briton Ferry): Members—Messrs. W. H. Johns, Swansea; L. W. Nuttall, Pembroke Dock; John Robb, Chepstow; W. G. Stowe, Beaufort; David Muir, Pontypridd; T. G. Jenkins, Abertillery. Students—Messrs. S. D. Coole, Roath, Cardiff; H. T. Lewis, Abertillery; T. G. Thomas, Neath.

Annual Report and Accounts.

The Hon. Secretary read the report and accounts. The former revealed a balance in the Treasurer's hands of £36 18s. 3d. The fifteenth annual report stated that during the past year seven members had joined the Institution, one student had been transferred to membership, one member had died, and two members and one student had resigned—leaving the roll at the end of the year at 71 members and one student. The receipts for the year amounted to £49 18s., and the payments to £36 10s. 7d. The National Gas Council and Federation of Gas Employers had been at work during the twelve months, and excellent progress made; and the Council strongly urged those members who had not already joined to do so. The Council were pleased to report the recognition by His Majesty the King of the excellent work done by Mr. J. H. Canning, in reference to the supply of material for high explosives during the war, by making him an Officer of the British Empire.

Mr. T. H. Hazell (Newport), in proposing the adoption of the report and accounts, remarked that the latter were satisfactory, inasmuch as there was a fair balance in hand, which represented a good send-off for the current year. As to the report, the industry had gone through some very exciting times during the period under review, which, of course, were not very plainly set out in the report. Very much more work was done than was shown in the report. It had been an epoch-making period, both financially and technically, for the industry. They must hope that with the new order of things coming about, with the promise of better treatment by the Government, which they had deserved in the past but had not received, the gas industry might rise phœnix-like from the ashes.

Mr. D. J. Davies formally seconded the motion.

The Chairman said that, before putting the resolution, he wished to thank them for the very kind reference made to him in the report. Really, he felt that he had certainly deserved no more recognition than anyone else in the industry; and he looked upon the recognition in question as having been given to what he might call the "team work" of the whole district. He wished to express now his great indebtedness to the Committee who had so ably assisted him in the war period. It was impossible to pay them too high a tribute. Very few people knew the immense amount of work they did, and the ground they covered, in going round to assist the Government. It was true that, in spite of all the industry had done, they had received very scant justice from the "powers that be." Now there seemed to be an opportunity of securing a remedy; and he appealed to all those present to do everything in their power to help in its passing through Parliament (with suitable amendments, if possible) the Gas Regulation Bill, which had just been read a second time.

The report and accounts were then adopted.

The New President.

Mr. Mogford proposed the election of Mr. J. H. Canning as President. Certainly, he said, Mr. Canning needed no introduction to them, neither did the work he had done, which must commend itself to them. He had been in the chair before; and the Institution had flourished under his presidency. They had heard how hard he worked during the war, and were convinced that the honour conferred upon him had been well earned. Mr. Canning had for some years represented them on the Council of the Institution of Gas Engineers; and his work there had been creditable to himself and useful to the district. It was to be hoped that, when the period had elapsed for which he had to stand-down, he would again be elected to represent them. With him in the chair the interests both of their Institution and of the gas industry generally in South Wales would be well looked after.

Mr. J. Robb (Chepstow) seconded, with the remark that Mr. Canning was one of the "indispensables" of the Institution.

The Chairman suitably acknowledged the honour that had been done him. He proposed the re-election of Mr. Octavius Thomas as Hon. Secretary, declaring that this gentleman certainly came first among the indispensables.

New Office-Bearers.

The following is a list of the office-bearers elected for the ensuing year:

President.—Mr. J. H. Canning, of Newport.
Vice-President.—Mr. J. A. Boucher, of Maesteg.
Members of Council.—Mr. D. J. Davies and Mr. E. D. Wootten.
Treasurer.—Mr. H. Morley.
Hon. Secretary.—Mr. Octavius Thomas.
Auditors.—Mr. G. S. Davies and Mr. F. Hill.

Benevolent Fund Contribution.

Mr. W. H. Johns (Swansea) said that, though he had only just been elected a member, he would like to propose that the sum to be subscribed to the Benevolent Fund of the Institution of Gas Engineers be increased on this occasion to five guineas. All the members were familiar with the work of the Benevolent Fund Committee. They had unfortunately during the war period been called upon to give more money than in the past.

The Hon. Secretary seconded the proposition, and appealed to the members to subscribe individually as well. The money was urgently needed, and was used in a very good cause.

The Chairman said it was, at the moment, felt that the sum proposed was the most they could afford; but if it was the wish of the members, and things went along as they were doing now, a little more might be spared later on. There was no worthier object to which to devote their surplus funds.

The proposition was agreed to.

The Local Gas Industry.

A paper prepared by Mr. H. D. Madden, of Cardiff, on the "Gas Industry in South Wales and Monmouthshire," was then, in the absence of the author, read by the Hon. Secretary. The paper and the discussion on it, will be found on p. 725.

The Chairman said he was very sorry Mr. Madden was not able to be present to read his paper; but he was detained in Cardiff on business. He proposed a hearty vote of thanks to him for his contribution.

Mr. Mogford seconded the vote, which was cordially passed.

Before rising, the members thanked the Mayor and Corporation of Brecon for the use of the hall, on the proposition of Mr. Jackson, seconded by Mr. R. G. Clarry.

The place of next meeting was left to the decision of the Council.

LUNCHEON.

The party then adjourned to the Castle of Brecon Hotel, where they were the guests at luncheon of the Chairman and Directors of the Brecon Gas Company—Alderman E. A. Wright presiding.

Alderman WRIGHT, after the Loyal Toast, proposed "Welcome to the Wales and Monmouthshire District Institution of Gas Engineers and Managers. He remarked that, of course, the works at Brecon were very small; but the Directors were rather proud that they had been able to pay a very fair dividend previous to the war. From what he could gather, the works must have been among the first to be established in Wales. About 1815 to 1820 works were erected under a lease from the Brecon and Abergavenny Canal Company to Hugh Jones and two brothers, as the Brecon Gas Light and Coke Company. The price of gas then for a cockspur burner with three holes was per year of 313 days: From sunset to 8 o'clock, £1 1s.; to 9 o'clock, £1 10s.; to 10 o'clock, £1 19s.; to 11 o'clock, £2 8s. There was no gas supply on Sundays. In 1856 the present Company was formed as a limited company under a deed of settlement with a capital of £6000, entitled to a dividend of 10 p.ct. The price of gas was 7s. 6d. per 1000 c.ft., with a discount of 10d. for quarterly payments. In 1870, the Company obtained an Act of Parliament; and the capital was increased to £10,000. The price of gas was 5s. per 1000 c.ft. net. A Provisional Order and sliding-scale were secured in 1882, with additional capital of £5000. The price of gas was reduced to 4s. 2d. per 1000 c.ft. net. In 1917, they obtained a Calorific Power Standard Order of 500 B.Th.U. under which they were now working. Some years ago the freehold of the works was purchased. The population of Brecon had not increased during the last thirty years or so; but they had doubled the gas consumption on the same population. They were much indebted to the Institution for valuable services rendered to the gas industry in Wales.

Mr. CANNING responded; remarking that now it was universally recognized that the greater the union the greater was the success achieved. The gas industry had suffered in the past from isolation; but Institutions such as theirs had altered this. He acknowledged their indebtedness to the good offices of the owners of gas undertakings in the district, and pointed out that the undertakings themselves had benefited very largely from the meetings.

On the proposition of Mr. HAZELL, the Company were thanked for their welcome and hospitality, and complimented on their enterprise in acquiring the freehold of their land. He also mentioned that, in spite of being a small Company, they put up an oil-washing plant of their own during the war, and worked it for the benefit of the country to provide high explosives. This ought to stand them in good stead when the conditions of gas companies were reviewed.

Mr. LEWIS JONES (a Director) replied, and declared that they always endeavoured to keep up to date, so far as a small Company could.

THE GAS-WORKS VISITED.

Under the guidance of the Manager (Mr. George Herris) there was an inspection of the gas-works during the afternoon. Though, as had been stated, these are small, there were two features of special interest to the members. The first of these was a very old gasholder house, the bottom part of which is now in use as a tar-tank. The second feature was a blue water-gas generator, which is proving a very satisfactory adjunct to the coal-gas make. The plant is the result of experiments carried out in a works of about 30 to 35 million c.ft. capacity at Cwmbran (Mon.), and has been in use for nearly five years, making about one-third of the total gas. Previous to its adoption, a Dellwik plant (now abandoned) was in use; and the relief holder has been utilized for the present arrangement, enabling the generator to be worked at its full capacity—or standing-by as required. In these favourable conditions, more than 200,000 c.ft. of gas has been made per ton of coke; but with varying requirements, when the plant is connected directly to the foul main, the results are naturally not so good. The Brecon apparatus has been in use for about a month, and is giving every satisfaction; and this also applies to a smaller one of similar type which has been in use at the gas-works at Blaenavon (Mon.) for about two-and-a-half years. The space occupied by a plant to make 20,000 to 30,000 c.ft. per 24 hours is very small; and the construction and method of working are so simple that it can safely be trusted in the hands of unskilled workmen. The gas will burn freely immediately after being scrubbed with cold water, and with slight carburation will produce good incandescence in a "C" mantle. The patentees are Mr. T. B. Walker, of No. 3, Baron Road, Penarth, Cardiff, and Mr. T. H. White, Gas-Works, Cwmbran (Mon.).

ASSOCIATION OF TECHNICAL GAS OFFICIALS.

Following this, there was a meeting of the South Wales District of the National Association of Technical Gas Officials, presided over by Mr. T. E. Franklin, of Barry. The Hon. Secretary (Mr. Mogford) submitted a report, the details of which were discussed.

A return was then made to the hotel for tea; and then the visitors left Brecon—bearing away with them many pleasant recollections.

There is to be a special meeting on the 25th inst. of the London and Southern District Junior Gas Association to hear a statement by Mr. W. M. Valon, of Stafford, regarding the National Association of Technical Gas Officials. For the afternoon of the following day (June 26), a visit, in which ladies are invited to join, has been arranged to the works of the Windsor Royal Gas Light Company, where a pleasant time will be spent in the care of Mr. Herbert Buckley, the Engineer and Manager.

THE INDUSTRY IN SOUTH WALES AND MONMOUTHSHIRE.

By H. D. MADDEN, of Cardiff.

[A Paper read before the Wales and Monmouthshire District Institution of Gas Engineers and Managers]

In presenting this paper I make no apology for the title, as I feel that the past six years have been so strenuous to our industry, and to our Institution also, in examining and dealing with a plethora of entirely new matters and situations, that no time has been left for examination or any calm reflective review of the facts and present position of the industry as represented by the area of South Wales and Monmouthshire.

GROWTH OF THE INSTITUTION.

It is but a few years ago that our own District Institution was first formed; and it has always been a source of wonder to me that this area should have been the last to unite and pool its technical and commercial forces for the industry's welfare, when one examines the geographical position of South Wales and Monmouthshire in relation to England. Cut off by the Bristol Channel and the wide Severn, but a few years ago a journey to the English counties was a formidable undertaking, involving, so I understand, a change of trains and a boat trip across the Severn. This, however, was changed by the construction of the Severn Tunnel; but there is no doubt that the isolation of the South Welsh section of the gas industry for so many years undoubtedly left its mark; and the lack of a local Association caused many difficulties, and must have been acutely felt by the engineers and managers of the various undertagings in our area at that period. These difficulties have been swept away. Our Institution has grown in strength, and now works in direct conjunction with its important sectional branches, with the National Gas Council, the British Commercial Gas Association, and the Special Purposes Committee, which have done so much to organize, vitalize, and stabilize our industry in South Wales.

This is to the good. But much remains to be done; and one must view the present general and future position with as broad a view as possible, when examining the locus of the industry in South Wales. Geographically, we have a mountainous area intersected by a few valleys containing probably the most wonderful coalfield in the world, and good water-collecting areas, ranging down close to the coast line, which in itself contains some of the finest harbours and docks in the kingdom.

LOOKING FORWARD.

The resources of South Wales are just being dimly appreciated, and it is no wonder that industrial concerns are seeing vast possibilities and potentialities, and erecting works of such magnitude and importance, which bring in their train large numbers of skilled and other operators, who must be catered for in the housing schemes of to-day and in the very early future. Through this, many of the towns represented here to-day are, or will be, faced by conditions that will call for greater demand on the manufacturing plant and distributing systems. In view of this, it is as well to plan as broadly as possible, and to use wise imagination when peering into the future, to ascertain forward possibilities and requirements.

In street planning for distribution, one feels it is wise to err on the side of larger service mains; for the load on these is sure to be a growing one. With coal at its present-day figure, and the desire of all classes to reduce house labour to a minimum, householders will require apparatus to this end; and a good supply of gas by day and night will be welcomed for lighting, cooking, heating, &c. The gas-fire will, I am sure, find a home in the working cottage to a greater extent in the future, to the abolition of the consumption of raw coal, with its aftermath of dirt and cleaning up; and I venture to believe also, on the score of fuel conservation in the truest spirit. Let us therefore assure ourselves that the appliances supplied to meet these needs are of the most useful and efficient types.

PECULIARITIES OF SOUTH WALES COALS.

A fact dimly appreciated by our *confrères* of English undertakings is the entirely different quality and character of South Wales gas-making coals, which must be considered and dealt with on their own respective merits and phenomena. Drawing a curved or graph line from the North East Coast, from Northumberland and Durham, through South Yorkshire and the Midlands, and continuing through the Forest of Dean, through South Wales to the Swansea District, it is to be noted that the volatile contents of the coals appear to decrease gradually, until the practically non-volatile coals, or anthracites, are to be found in the Swansea area. Right through the South Wales area the gas coals are infinitely lower in volatile matter than in the Midlands or the North. Why this formation should so occur I cannot offer any tangible suggestions, and I trust your discussions will throw some light on the phenomena. However, we are faced with this coal, and have to use it; and your experiences with the varying grades, under carbonization conditions, are experiences that could be ventilated with advantage.

The tars produced, generally speaking, are of a heavy specific gravity and of a sticky nature. Some welcome light could be

thrown on this subject, because most works in our area had during the war period the "C" process for recovering the T.N.T. bases; and the experiences so gained should be valuable data on the subject of tar production—a highly important one to-day, and worthy of intense cultivation from both commercial and national standpoints. With all the difficulties of thick tars, I venture to believe that accumulated experience will enable us to devise improvements in the yield and quality of tars produced from Welsh coals in existing horizontal and inclined settings. My own experience with vertically produced tars from similar coals is that it is a fluid material of rich and oily nature. The question naturally follows: Can we make a more valuable article with ordinary settings using Welsh coal, and how?

Available ammonia from our local coals is, generally speaking, very low; and in view of the value of all bye-products to-day, to set against the first high cost of the coal, the production and conservation of this product is of high importance, as equally, too, is that of the production of coke and breeze, both in quantity and quality, available for sale. Practices which are entirely satisfactory in manufacture with cokes from English coals cannot be utilized in the same exact way when our local cokes are in use. Without labouring this point, many such instances of application will readily occur to your minds. Unquestionably, some of the finest coking coals in the United Kingdom are to be found in South Wales; but the volatile properties are, generally speaking, in inverse ratio.

The practice of blending coals for coking qualities is a subject that is well worthy of consideration, whether the ultimate product is entirely for sale or for part use in carburetted water-gas plant. Coke of good quality commands respect in the commercial world, and obtains results in manufacturing and technical application. It must be ever-remembered that coke forms one of the greatest assets in the balance-sheet.

In setting forth the merits and difficulties of our local coals in the practice of carbonization, the writer would venture to suggest to the members that an informal technical meeting or two per annum might do much to bind our interests together, by discussing in an informal way prearranged questions or problems relating to our local experiences, with the defined object of obtaining the best ultimate results from the minimum of raw material used. The subjects relating thereto are so great that individual items, with data collected beforehand from all works on a given subject, and openly and freely discussed between the members, would form a basis of a "Local Investigation Committee," who could not do otherwise than bring benefit to the industry in Wales, by such united action and concentration of each point under review. The writer believes that we are only at the initial stages of knowledge relating to Welsh gas coal, and that much can be achieved by united concentrated efforts and pooling of information.

The Gas Regulation Bill.

Another new factor has arisen. I refer to the Gas Regulation Bill. All our members are now familiar with the clauses and objects outlined therein; but as the matter is, so to speak, *sub judice*, we must particularly refrain from any individual or collective expression of opinion that might prejudice in any way the trend of its objects. Generally speaking, it is a wise measure; and the Board of Trade are to be congratulated in the general wide survey it has taken, although it pays but tardy justice to the great industry that stepped into the breach, and with devotion and sacrifice of self-interest, supplied the Allied Forces with ample high explosives, antiseptics, and other materials of war, and, as Lord Moulton, the Chief of the High Explosives Department, said, "made victory possible." Without thought of adequate remuneration, or the great difficulties, our industry came to the front at once; and South Wales and Monmouthshire, with probably greater difficulty than any other part of the kingdom, did its share, and strove earnestly to produce the greatest amount of high explosive bases from local coals. Gas-works and coke-ovens united in the common effort, and helped to forge the weapons of victory.

The lessons learnt from the war period must not be lost. We must adjust the valuable information gained to peace-time services. How can this be best done? Reviewing the past years of strenuous effort and the cost of raw materials, &c., to-day, together with the new charter that the Gas Regulation Bill is providing for the industry, how can we, as an industry, meet the situation? The answer is by greater acknowledgment and utilization of the value of chemical and scientific service in the daily routine of each and every gas-producing works.

Value of Science in the Industry.

There can be no question of belittling or begging the question, or fact, if results are required—and they will be more and more—that trained scientific brains must be utilized in our processes, and rule-of-thumb and navvy methods entirely dispensed with. A Cardiff tramp steamer consuming quite a few tons of coal as bunker fuel per day has a staff of shift engineers or technical economizers, if they may be so described. Why? Obviously because the economy effected more than pays. To us, with even small works, it is evident that skilled supervision all the time is a commercial proposition well worthy of consideration—trifles in manufacture which on paper appear in analyses as decimal points are, when translated into commercial figures, valuable assets. Taking this in conjunction with the Board of Trade Bill, and the necessity of strict manufacture and control, it is unhesitatingly a question of immediate concern to us, and we ought to be in a position to attract the best brains, scientifically educated, to the industry. The electrical industry has resolved its technical training into an exact science. Our own industry has technical problems to investigate and solve that require more resource and inventive imagination, together with scientific training—problems that cannot be resolved and worked-out by purely mathematical equations.

Dr. Charles Carpenter, of the South Metropolitan Gas Company, has done much to advance chemical science in relation to our industry, and, in his wisdom, has applied the chemical and physical laws to regulating and supervising the daily routine of the retort-house, and rightly so. It is often said "Yes, that is all right for large works; but how does it suit small and medium-size works?" If gas making is not a science, and if applied science together with practical training cannot give the highest efficiencies and an adequate return in every practice, and more than thoroughly pay for itself, the outlook would indeed be a poor one. I am a strong believer that the very best technical training is to the best advantage of our industry, and know the value of the results that accrue. Do not be misled and expect testers to do the work of chemists; results do not lie in that direction.

Technical Training in South Wales.

In South Wales, the provision of technical training has been slow to get a start; but with the opening-out of the industrial possibilities, and with the well-known enterprise of our large seaport and mining towns, a greater awakening has taken place in recent years, and big strides have been made. As your representative on one of the Sub-Committees of the City of Cardiff Technical College, which specially deals with chemistry applied to industrial engineering works, I have often been struck with the opportunities afforded by the courses of training, thoroughly practical in application, that are arranged and offered to the students and chemical and physical specialists to-day. I cannot speak in sufficiently ample measure of the forethought and the care with which the new and practical way of teaching Applied Science has been thought-out and arranged, and facilities provided in the Technical College of Cardiff to-day, which also caters for a very wide area in engineering, chemistry, and applied technics. One member of our Institution, Mr. G. Clarry, was Chairman of the Committee; and I am glad to mention here that we are much indebted to his efforts in the advancement and linking-up of technical education with industry on a practical scale.

Let us, then, as an industry, wholeheartedly support this scheme and, with a strong watching brief, as we now have, see that the technical men of our industry are properly trained, utilized, and recompensed, to the ultimate benefit of all interests concerned. While on this subject, I venture to hope that one day in the near future our Institution may be accorded the benefit of an invitation to inspect the new Technical College at Cardiff, and see the methodical training systems in operation there under the skilful and energetic direction of Principal C. Coles, B.Sc.

Why Not a Junior Association.

Another factor in regard to the juniors of our industry. They will, of course, be the seniors one day. I should be glad to voice some expressions I have recently heard—viz., cannot the juniors in South Wales and Monmouthshire have a Junior Association similar to that in other districts of the country? Personally, I feel such a want should be met, and the juniors encouraged to meet under their own organization. They should be encouraged in the work of education and self-investigation of problems which can but benefit the industry in South Wales. The need is great, and we must support it.

Cutting Heat and Fuel Losses.

Other problems one hears, particularly in relation to South Wales, are carbonization and producing methods, having special regard to local coals and complete gasification of coals. This item must be considered from several aspects—size of works, suitability of coals, and also from the standpoint of the greatest of our watchwords—viz., that the industry does not destroy coal, but supplies the method of sorting this complex material into its many valuable substances, on which the country depends.

The greatest interest is centring around the retort-house and gas-producing plant; and waste-heat losses in gas-works practice are now receiving the attention the subject merits. Heat losses and fuel losses must be cut-out as speedily as possible.

Advantages of Combined Gas and Electricity Supply.

Our *confrères*, the coke-oven people, are particularly active and strong in our area. We have much to learn from one another. In some directions the view-points are different, but probably they will be co-ordinated as time and experience ripen.

The era of gaseous fuel and of the internal combustion engine is quickly being realized, and as an industry we must be prepared to cope with all its phases in a masterly manner. In South Wales, very often, water and gas supply go together, and in several instances gas and electricity production. The writer's opinion was recently asked as to the advisability of the dual supply being available. It seems to me that the works that supply the gas power can be made to be the cheapest and the most efficient suppliers of electric current, if the current is generated by gas-engines. Initial capital cost, ground space, boiler power, and other material are reduced by the utilization of the gas-engine as a prime mover; and the efficiencies of this engine

against a boiler installation and its wasteful use of coal cannot be exaggerated. The question is a fruitful one to our areas of supply, and should receive the adequate attention it merits, as also the concentration of gas production in rapidly-growing areas where two or three gas producing plants are in operation within visible distance of one another. Gas production will live and thrive by common sense and technical skill, but not by duplication of capital costs and unnecessary lack of co-operation, and by imaginary lines.

Frankly, my object in selecting the title was the hope of a refocus of interest and usefulness in the technical work of our District Institution, and a review of the problems that await us through the altering conditions, and also to bring strongly before you the vital necessity of the early provision of properly-trained technical men and the maintenance of a high standard in all ranks of the profession.

Before closing this contribution, I would like to state that it was undertaken at the request of our President, and our indefatigable Secretary, Mr. Octavius Thomas, at the eleventh hour, so to speak. If points are not elaborated as you might have desired, lack of time is my excuse.

DISCUSSION.

The CHAIRMAN (Mr. J. H. Canning, of Newport) said Mr. Madden had, at very short notice, produced a paper which bristled with points, and raised some very wide questions. He had increased the deep obligations they were already under to him for the many excellent contributions he had made to their proceedings. Mr. Madden was now one of themselves; but he was, so to speak, an adopted son of this district. He had been with them a great many years; but he had also the benefit of experience of methods which were adopted in other districts. Consequently, he was particularly well qualified to judge impartially of the conditions obtaining in South Wales; and the paper possessed an added value on this account. The author had drawn attention to the fact that they were the last district in the country to form an Institution; but what they had lost in this way, they had made up in enthusiasm. There was hardly a District Institution in the country which took its duties more seriously than their own. This would, he felt sure, continue to increase in the future. There were one or two points in the paper to which they might particularly address their attention. The first was that of the planning of street-mains for distribution in the future. This was a question demanding careful thought, especially as the cost of laying street mains had gone up to such an extent; and it was also greatly tied-up with that of the proportion of inerts which were allowable in the gas, because obviously they must increase their mains if the inerts were permitted to rise above a certain figure. One of the chief difficulties at the present moment, however, was the fact that the public authorities had concentrated their housing schemes in particular districts. Previously housing development was evenly distributed; it went on regularly in all parts of one's district. But with the movement brought about by the Town Planning Act, and the new views with regard to housing—the improvement of the conditions under which people lived, the wider spacing of the houses, and the placing of them in garden cities—there had come this concentration in one or two parts of a district. This, of course, would often necessitate a very considerable extension of the mains to supply these areas; and with regard to this, they should consider carefully how far the gas undertaking should be called upon to pay for an extension which would be a very serious matter in these times. Had housing schemes not been so concentrated, the necessity for these large main extensions might have been avoided, or at least postponed. But they were faced with these facts; and he thought that a portion, at any rate, of the cost of these extensions should be borne by the housing authorities themselves. Mr. Madden next drew attention to the peculiarities of South Wales gas-making coal. He would not like to differ from the author; but he thought the term "gas making" might have been omitted. There were in South Wales certain coals worse than others for gas-making purposes; but he did not believe that anyone to-day claimed that there was in South Wales anything in the nature of what one might really call gas coal. They had the best steam coal in the world; but for gas-making purposes, it was certainly far from being an ideal substance. Reference was made in the paper to the diminution in the volatile contents of coal as one proceeded (say) from Northumberland and Durham through the Midlands to South Wales and Monmouthshire, and on to Pembrokeshire; and it was perfectly correct that the volatile contents did diminish, even in the South Wales district. The most highly volatile coals in the whole district used to be the upper seams in portions of Monmouthshire, which were worked out many years ago. He believed there were there one or two seams which were very fair gas-making coals; but the demand for them naturally was very great; and they were exhausted probably thirty or forty years back. Then as one went towards the western portion of the coalfield, the volatile content diminished rapidly; and when one got towards Carmarthenshire, and even Pembrokeshire, these constituents disappeared entirely. It was certainly the case that some of the coals in this particular district produced a very sticky and heavy tar, which was difficult to deal with; and from personal experience he could say that this was not due entirely to the adoption of more modern methods and higher heats, for he had known it to occur with certain coals even with the comparatively low heats obtaining twenty-five to thirty years ago. The principal subject to which he wished to allude was one that it was no doubt now permissible to discuss to a certain extent, and that was the Gas Regulation Bill. There was one very important feature of the Bill to which, especially in their district, particular attention should be devoted. It was proposed under the Bill to confer certain powers upon the Board of Trade; and among others was the power to limit the proportion of what was termed inert or incombustible constituents of the gas. He would like to make it perfectly clear that personally he was no advocate of the unlimited dilution of gas with inerts; but a certain proportion of inert constituents, varying according to the nature of the coal and the conditions of working, was quite inseparable from operations of gas making. He considered that 15 p.ct. would be a very difficult figure to work to, and would involve very onerous conditions of working in a great many places—especially small works. But what he wished to point out was that, whereas they were liable to be put under this restriction, and the shareholders were liable to be penalized in case of non-observance of this and other regulations which might be imposed upon them, the coal suppliers were under no restriction whatever, and were at the present moment supplying coal which contained something like 20 p.ct. of inert material. Under the Bill, whatever inerts the gas undertaking supplied in their gas they were not entitled to be paid for; but the coal suppliers could charge for their inerts, and did so, at the full value per ton of coal. In the next place, while, if the Bill was passed, gas undertakings were to be bound-down to certain conditions, they had no choice at the present moment—and he did not know that they would have any choice—in selecting the most suitable coal for their operations. This was just now a matter of immense concern to the gas industry. They were to be bound-down to supply gas of a certain quality, and fulfilling certain specified requirements; and yet they did not know what sort of coal was going into their works next week or next year. None of the provisions of the Bill should become obligatory until such time as the gas industry was able to select its own coal. Otherwise he could not see any possibility of one being able to comply with the requirements—especially in view of the conditions obtaining in their district. There was not the slightest doubt about it that whoever selected the coal to be used in a works practically decided the quantity and quality of the output, other things being equal. At the present moment, the gas undertakings had not this power in their own hands; they were not free agents. Therefore he did not think it was quite fair that they should be tied-down to conditions which, whatever might be said about them, would be rather more difficult to comply with than those under which they rested at present. There were two alternative methods which might meet their difficulties. First of all, the suspension of the penal clauses of the Bill in some way until coal was completely decontrolled; or, secondly, it might be suggested, very respectfully, that the Board of Trade Fuel Research should devote as much of their attention to the quality of coal supplies as they were doing to the quality of gas supplies. The Board were doing much useful work; but in commencing with the quality of gas, before going into the quality of coal, he ventured to think that to some extent the cart had certainly been placed before the horse. If they could be assured of coal being properly allocated, and steps being taken in some way or other to improve the quality in the direction of diminishing the inert material, then they might accept, with some chance of working up to them, the obligations to be imposed by the Bill. In regard to the appeal for better facilities for the technical education of everybody engaged in the gas industry, and the growing necessity for improving the supervision of works, he agreed that even a comparatively small works at the present time would find that good technical assistants would help them. With rising costs in every direction, one might at first sight be inclined to say that extra assistance could not be afforded. But when the matter was considered carefully, this offered the strongest argument in favour of the adoption of the best methods possible, and the securing of the most efficient men for controlling operations, because the very fact that costs had gone up so much would enable one to effect economies by the exercise of skill which would certainly go a long way towards paying for the additional assistance. But if they were to get the best type of men into the industry as foremen, assistants, and to fill higher positions, it was absolutely essential that sufficient inducement should be held-out to people to go through the long course of training requisite. At present, things were so topsy-turvey that it was quite possible for unskilled men, without knowledge of any technical operation, to command remuneration which many assistants, and even managers, of gas-works in pre-war days would have jumped at. The industries which were to succeed—and the gas industry had competitors—must attract to themselves the best brains possible; and the only way in which this could be done was by offering adequate remuneration, and thus encouraging young men to enter the industry and equip themselves for its work.

Mr. W. C. JACKSON (Neath) remarked, with reference to scientific training, that most of them now realized the great importance of this; and even in the smaller works it had been found to pay to have assistants to carry out tests upon such things as waste flue gases. It was about time that some college or other in their district took up the question of gas engineering classes, so that the juniors who happened to live anywhere near the centre could be able to get actual demonstration and training similar to that which could be obtained in other provincial centres. If places like Portsmouth and Edinburgh—and doubtless there were many others—could maintain gas engineering classes, it was quite time they should try to secure the same facilities in their own district. At Neath, some new plant was being put in; and in conjunction with this his Committee had decided to have a waste-heat boiler to generate steam, and so save labour and coke. As to main-laying, he was afraid Mr. Canning was up-against a very complex and difficult question, if he thought local authorities were going to subscribe something towards the cost. He (Mr. Jackson) wished they could get the authorities to see eye to eye with them in this respect; but when they saw the efforts made to cut-down the price of the houses to the lowest limit, and to reduce the gas-fittings and if possible squeeze out the gas-cooker for the sake of the few pounds it would cost, he was afraid it would be a long time before they got them to pay anything towards the cost of laying the mains. Informal meetings to discuss special matters would no doubt be of great benefit.

Mr. J. MOGFORD (Briton Ferry) said the paper was very acceptable to those of them who had spent practically the whole of their lives dealing with the coals of the South Wales field. When they met men who came from the North of England, and told them of their difficulties, and that they had no coal at all in the sense in which it was understood in the North, these men were as a rule a little sceptical, and thought possibly it was not all to do with the coal, but might perhaps have something to do with the man. Therefore a paper like Mr. Madden's was very helpful. The author referred to coal, and drew a line from the North right down, and expressed the opinion

that the volatile content decreased as the line went down. It seemed to him (the speaker) that the coals of South Wales were a problem in themselves—the bituminous coals especially, because they had them varying in different localities. He had had coals from Mid-Glamorgan which were practically solid blocks of cannel, used them for about twelve months, and then they had disappeared, so far as he could see, for ever. Other coals they had had with small quantities of cannel in them. He had found that the tars varied considerably from the different coals. They varied, of course, with the temperatures; but often with the same temperatures they varied considerably. As an old student of the Engineering Department of Cardiff University, it had interested him considerably to find that the work which was in hand twenty odd years ago was progressing, and that there was now a good technical college for training engineers. In the olden days they had the best of professors, and a little of the best of plant; but what they did then would hardly be adequate for a modern engineering training, and he was glad to know that progress had been made, and the college was suitable to train engineers for the highest positions in the country. They wanted to train local well-educated youths to deal with engineering problems peculiar to South Wales. If a visit to the college could be arranged for the Institution, it would be very interesting indeed. The Gas Regulation Bill was going to be all and everything to them or nothing. Once it passed into law, anything they might have to say would be of little avail. The inerts clause had been discussed in and out; but he hoped they might be let down more lightly than at first sight appeared likely. As to the remuneration which went to investors in the gas industry under the Bill, it seemed all they could hope for was to get back to the pre-war dividends. This was a small mercy, for which they would have to be thankful, but it was very hard lines that investors in such an industry should have to be content with 5 p.ct., whereas they saw the steel and coal industries and others reaping huge benefits. The gas industry had done its bit during the war; and the thanks for it should come in some more tangible form than 5 p.ct. He failed to see why the gas industry should not be treated on more liberal terms, because people who put their money into it years ago had to be content with their stocks at from 50 to 70 p.ct., whereas if a structural valuation of the concerns were taken, it would surely show that the works were worth twice as much as in pre-war days. It seemed hardly fair that an old-established industry like their own should not have some little share of the remuneration that other people had been getting. He quite agreed that unless a man had had some technical education, it was impossible for him to run a small gas-works as it should be run. An inefficient man could not possibly earn the dividends that a properly trained man could do. With regard to the suggestion for generating electricity with gas-engines, whatever might be said of the combination of the two services in small towns, he did not personally think that anything much was to be gained by generating electricity with gas-engines, unless gas-engines were developed to drive large units. For very small power, the electric motor was a handy sort of tool; and where there was an electric supply the best way of using small units was to have the motor connected with the electricity supply. For a larger size, the gas-engine on town's supply had a very high efficiency, and would turn out to be cheaper than the motor. Coming to still larger units, the suction plant beat town gas out of the field. For very large units, there was no question about it that with present-day practice the steam-engine was very reliable, and as highly efficient as they could get. As a gas man, he was still in hopes that the large gas-engine would develop.

The Chairman at this point had to put an end to the discussion, as the time for finishing the business had arrived.

Mr. Madden was unable to be present to read his paper, but forwarded to the meeting a few remarks to close the discussion; and in the course of these he said the paper was written before the Institution meeting recently held in London. He gave this explanation, because "efficiencies" were the keynote there; and he did not want to be accused of plagiarism. It would appear that the raising of efficiencies, and the prevention of heat losses, was now becoming a question of very great prominence, and was the direction the industry must follow if further economies were to be made. In regard to other matters of local interest, he might venture to cite an instance—the use of the step-grate with Welsh coke for the purpose of heating retort-settings. This was quite an easy matter in the usual way; but he was particularly referring to its use without the aid of false or spear bars when clinkering. That was to say, maintaining the heats by the use of a pricking-bar only. When first tried, the procedure gave some trouble, and was nearly abandoned; but after some investigation and experience, furnaces and settings were so adjusted and regulated that the fires had not had false bars inserted for over six months. They kept more regular heats, and the quantity of ashes was considerably lessened; while in addition there was a considerable saving in the smithy repair of the false bars. There were many such questions that could be dealt with; and he asked members who met with such problems to tabulate all experience and data, and present them in paper form to the meetings.

WAVERLEY ASSOCIATION OF GAS MANAGERS.

ANNUAL MEETING IN EDINBURGH.

The Annual General Meeting of the Association was held on Friday in the Cockburn Hotel, Edinburgh. Mr. R. Hamilton, of Dalkeith, the President, occupied the chair; and there was an attendance of some fifty members.

At the outset, an apology for absence was submitted from Mr. Alex. Masterton, the Engineer and Manager of the Edinburgh Gas-Works, who had been unexpectedly called out of town.

Financial Statement.

The financial statement which was submitted on behalf of the Committee showed that the income for the year had amounted to £44; and after meeting all necessary expenditure, there was a balance in the hands of the Treasurer of £19 15s. 1d.

The President said he felt the congratulations of the members of the Association were due to the Secretary for the condition of the finances.

Mr. J. D. Keillor (Hawick), Hon. Secretary, said he could not take very much credit for the balance that they had in hand. As a matter of fact, the credit balance was due to the small expenditure incurred during the year for Committee meetings.

The financial statement was approved.

Elections and Appointments.

Nominations were submitted on behalf of six ordinary and two extraordinary members, who were admitted.

The President said he had pleasure in moving that the President for the ensuing year should be Mr. R. J. Philp, Gas Manager, North Berwick.

Mr. A. Kellock (Airdrie) seconded the nomination, remarking that Mr. Philp would do all he possibly could to keep the affairs of the Association well in the forefront.

Mr. Philp said he was grateful for the honour paid him in electing him President of the oldest Association in Scotland.

The re-appointment of Mr. Keillor as Hon. Secretary and Treasurer was agreed to unanimously.

Messrs. A. Dow (Galashiels), Macdonald (Prestonpans), and Taylor (Aberlady) were elected members of the Committee.

The re-election of Mr. John O'Halloran as Auditor was also agreed to.

Next Year's Meeting.

The President said it was proposed to meet next year in Hawick, so as to give the members an opportunity of seeing the vertical retort installation which would very soon be in complete working order there.

THE PRESIDENT'S ADDRESS.

The President thereafter delivered the following address:

Gentlemen,—We are now labouring in the aftermath of the great war; and to many of the members of the Association the question of coal deliveries began to assume a serious aspect during the winter months. A question that is still with us, even in these days of minimum output, is how to get up stocks against the coming winter. Shortage of railway transport, and lower outputs from the pits make the prospect anything but pleasing; and I venture to predict that there will be great difficulty in obtaining increased supplies to build-up a reserve sufficient to meet the demand in the coming season.

The industry at the moment has to face a very unstable and unsatisfactory supply of fuel, with no indication of the ever-rising costs of material and labour required for manufacture and distribution reaching high-water mark. This hampers the full development of new ideas and ideals—the one bright prospect at present being the demand and price we are receiving for our residual products, which I am convinced has gone a long way towards keeping the increase in the price of gas from equalling the costs of our raw materials. During the past year, owing to the scarcity and high cost of coal, the demand for coke has been unprecedented. Most satisfactory prices have been obtained for the product; though I regret that my Company, unfortunately, did not take advantage of the tar and liquor sales' scheme.

With reference to our Commercial Section, I do not wish to negative the advantages we have in our usual monthly lists; but, as stated five years ago, I think we should derive greater benefit from the section if we had a meeting at least every quarter, at which prices and stocks could be discussed. Also, if the meeting was held in various towns in the district, managers from near-by towns could attend and have prices arranged, so that we should avoid undercutting our neighbours.

It is not many years ago that coke was a drug on the market. Stocks were accumulating in most works; so much so, that at times coke was sold at prices that would not suffice to put it on rail to-day. If arrangements could be made at a Commercial Section meeting whereby managers having a surplus stock could be assisted to dispose of it without an unnecessary cutting of prices, we should mutually benefit thereby.

The old adage "that profits were made in the retort-house" can be nullified by profits being lost in the distributing system. A large number of gas-works in Scotland, as shown by the returns prepared by the North British Association of Gas Managers, have over 10 p.ct. of unaccounted-for gas, which percentage could be greatly reduced by systematic overhaul of mains, services, and meters. There is no doubt that since the extraction of toluol, and our epidemic of steaming, a larger number of meters than usual have gone wrong, and do not register—more especially dry

meters. A reference to your accounts for repairs will bring to your notice the greater number than was formerly the case of meters which have required new diaphragms—no doubt accounted-for by there being less oils in the treated or steamed product than in a straight coal gas.

In these days of steam-rollers and heavy motor traffic, mains and services require to be laid deeper than was the case when they were laid, perhaps, forty years ago. Cast-iron pipes are far from the new ideals for gas distribution. But if they are in sound condition, they can be lifted and relaid at much less cost than the installing of a new system of rigid or welded steel mains; and unless the mains require enlarging I would advocate the relaying of all mains with not less than 2 ft. of cover—doing a few hundred yards every season, until the amount of unaccounted-for gas becomes normal.

In a works I once had charge of, the unaccounted-for gas was as high as 20 p.ct.; and I found that the mains had been laid over thirty years before, by contract, with anything from 5 in. to 12 in. of cover. After five years (during which I relaid from 600 to 800 yards each summer) the loss was reduced from 20 to about 4½ p.ct., at an exceptionally low cost. The pipes being sound, all we had to provide was about six lengths of the main we were relaying, and the labour required for the digging and jointing, with some extra jointing materials—viz., yarn and lead wool.

In regard to the jointing materials, I have tried various ways—molten lead, shredded or lead wool, and a combination of both. The latter gave me most satisfaction, as we very rarely found a leakage even before setting-up the joint.

My method of jointing a 3 or 4 in. pipe was to drive at least four turns of white yarn well home, take one skein of lead wool (usually 1 lb. in weight) and drive it solid, and then run what portion of the joint required filling with hot lead. In caulking the lead wool, the yarn was well set into the joint—there being no springing-back, as is usual with yarn alone. Then when run with hot lead, little more than dressing the face was required.

On one occasion we had the misfortune to split a socket; and, on cutting-out the damaged pipe, an examination of the joint proved most satisfactory. The yarn was very hard driven home, the lead wool solid (except where in contact with the yarn, where we could see traces of the fibre), and the hot lead had amalgamated with the solidified lead wool.

In reconnecting the services, most of the old holes were again utilized—two bends and a short connector being usually required, set at slight angles, which gave the connections flexibility; so much so that when the heavy wheel of the county road-roller was run upon the track within forty-eight hours of its being filled in, no damage resulted.

It is unfortunate that at present the capital expenditure involved deters many of us from introducing new and up-to-date plant, especially where the existing plant is sound and adequate to meet for some time to come the needs of the community. But to my mind the day of the total gasification of coal is coming—more especially so if we can obtain a gas that will maintain the same thermal value at the far ends of the distributing system that it has at the works, and sell it by the B.Th.U. value with a rational standard of quality.

We must make every endeavour to impress upon our consumers the advantages of obtaining their fuel in gaseous form, and to avoid the waste of the valuable volatile products that result from the use of solid fuel. We do not advertise these facts as much as we ought to. In one instance within my knowledge, the annual cost of gas for an all-gas house would not provide for the extra maid who would otherwise be required.

With regard to the use of gas for our new housing schemes, the various economies and greater floor-space obtainable by suitable flues being built into the thickness of the walls, should be kept well before all the authorities concerned. I still maintain that the provision in the scullery of a suitable recess for the cooker is far before anything in the shape of hoods that I have ever seen. I have an example in Dalkeith, with a cooker standing in the recess that in the next house is occupied by a small range. There is ample room at each side of the cooker for cleaning purposes, and storage for pots, &c.

In regard to the future, I am optimistic. The upheaval and chaos of prices and labour will in the long run cease. Costs will no doubt remain high, but will be established on a sound and firm basis, and the industry will prosper, and remain in the van of progress.

DISCUSSION.

Mr. R. W. COWIE (Port Glasgow) said it would be noticed that the President prefaced his address by suggesting an alteration in the rules. He did not exactly know what was in the mind of Mr. Hamilton. Rule No. 1 provided that the Association should be known as the Waverley Association of Gas Managers, but that the members should be confined entirely, as at present, to managers within the Waverley district. Throughout the remainder of the constitution there was nothing to debar any member from being a member of the Committee, from holding the post of President, or, in fact, any office whatever in the Association. He was not at all sure that the change suggested by Mr. Hamilton would be a good thing. The Waverley Association was distinct entirely from any other Association. Perhaps in recent years they had become a little more formal than hitherto; but this, he apprehended, was rather a product of the times. He felt that the Association should preserve its *status quo* so far as the holding of office was concerned. Speaking for himself he rather regretted having to give up the Secretaryship of the Association. It had been nothing short of a delight to him to carry on the work; and he was sure Mr. Keillor would by this time have experienced the same thing. Just before sending back the oldest minute book in the possession of the Association, he spent a pleasant and profitable hour or two in going over its contents. In the address the President had compressed into small compass a great many points that were of interest. It was rather a pity Mr. Hamilton's people did not see their way at the time to fall in with the Scottish Gas Council's scheme in connection with tar sales. Undoubtedly they had lost money by that course.

The PRESIDENT: Very badly.

Mr. COWIE (proceeding) said he thought the last award was 47s. 3d. for tar. If they compared this with 30s. 9d. (the price they were getting under the previous conditions), they would, he thought, be disposed to agree that it was really a marvellous figure. No doubt they were all pleased when they saw the monthly award maintaining an upward tendency; but, of course, they must not lose sight of the fact that the smile might perhaps be the other way altogether when prices began to descend. He noticed that, in the course of his address, the President offered some interesting observations on the reduction of leakage; and in this connection he had made reference to the statistics compiled on behalf of the North British Association of Gas Managers. On this matter of leakage, he (Mr. Cowie) thought the statistics were what might be called high, because the engineers put in the leakage as it actually appeared, without making any allowance for difference in temperature and pressure. Because of this, he felt the "leakage" was often represented as much higher than it ought to be. In Port Glasgow, it had been the custom for very many years to write-off 5 p.ct. from the leakage, as being traceable or due to the difference of temperature and pressure. As he had already remarked, this practice had been followed for quite a number of years; and, indeed, if it had not been done, then he was afraid he would have been at the top of the pole as far as leakage was concerned. Then he noticed that Mr. Hamilton made a reference in his address to the large number of gas-meters that were coming in for repairs. To a certain extent he thought it was not altogether true to say that this was due to the fact that they had been steaming and stripping their gas. It had to be borne in mind that during the war they could not get their meters; and the plain truth of the matter was that in these days they were dealing with the accumulations of five years. The arrears of the past were now being wiped off; and this was a circumstance that had much to do with the large number of meters passing through their hands for repairs. On the previous day, he believed there was an interesting function in Fife; and he was sorry he had not found it convenient to be present. He believed two of the gas-works in Fifeshire had installed plant for the total gasification of coal. Then he understood that if there was not already a gas-works in the Waverley district with this type of plant actually in operation, there would soon be one. To his mind, this idea of the installation of plant for the total gasification of coal was the direction in which they, in the smaller gas-works, had to travel; and probably by another year they would hear a good deal more about this subject. At the same time, he felt it would add to the interest of the meeting and the discussion, if some of the members who were at the function in Fife would give their impressions of what they had seen. Unquestionably, it was a very alluring prospect to get from 50,000 to 60,000 c.ft. of 420 to 450 B.Th.U. gas.

Mr. DAVID VASS (Perth) said he felt very much in sympathy with what the previous speaker had said with reference to the proposed alteration in the rules of the Waverley Association. The Association was unique in itself, in that in its discussions it dealt with matters that bore largely on the management and administration of the smaller gas-works. On this account, it would be wise for the Association to keep as much as possible to its own particular district. If they began to widen the scope in any way, they might bring into the fold managers of the larger works whose interests were quite different, in many respects, from those of managers who had charge of the smaller works. He had to compliment Mr. Hamilton on his success in overhauling his mains and services. It was strange there should be such a great difference in unaccounted-for gas in so many districts. He rather felt that the question of subsoil had a good deal to do with it. In his own district they had always had a very low leakage, due to the subsoil being fairly open, and enabling them speedily to detect anything in the nature of leakage. On the other hand, where they had the heavier clay soil that absorbed gases, it was not possible for them to detect leakage with the same facility. Touching upon his visit to Fife, where some of the works were going-in for the complete gasification of coal, he said this was a subject he had been watching with interest for a long time. The plant he saw installed in the works in Fife was the Tully. In Fife on the previous day the visitors saw nuts being carbonized; but in other places he had seen a mixture of nuts and coke used. In both of the works visited, they were making gas by ordinary horizontal retorts. The gas from the Tully plant was introduced into the hydraulic main, and a portion of it was enriched. The main body of the gas, however, was passed on through the scrubber, washed free from ammonia, and allowed to enter the holder. The Tully plant was capable of running a certain number of hours after they had filled the relief holder. One plant they saw in Fife was set for an eight-hour run. As things now were at these works, they were getting about 40,000 c.ft. to the ton; and the quality was probably something under 400 B.Th.U. No doubt, there would require to be an adjustment of nipples, &c., to meet the altered conditions; but the impression he formed of the plant was that it was to it, or something like it, the small works must look in the future to overcome the big prices for material and the high cost of wages. The labour for the eight hours during the run of the Tully plant was very simple, though constant. It was very light work; and the whole apparatus appeared to him to be fool-proof. He could well remember a good many years ago, when he was in the Waverley district, that his chairman once remarked that he made "millions of gas for his thousands." What was happening, of course, was that the chairman of the Company was making producer gas from the coal very much like the plant he had been describing. Unquestionably, this plant had been greatly improved as compared with the old producer gas system in vogue for many years in glass-making furnaces.

The PRESIDENT said the members ought to thank Mr. Vass for the special report he had given them of the Tully plant. In the near

future many of the smaller works would have to adopt a similar process. He certainly thought that a gas of from 420 to 450 B.Th.U. would be as satisfactory an illuminating power as could be found. He supposed he was right in assuming that the B.Th.U. standard of gas would depend greatly on the class of coke or coal used.

Mr. VASS said it would vary with the material used. Coke produced a fairly low grade of gas. Where coke only was used, he thought it would be preferable to stick to the horizontal retorts in order to obtain a fair enrichment—at least, for some time, until people could get accustomed to the lower grade. In reference to the constant use of a 420 to 450 B.Th.U. standard, many of them found during the years of the war that such a quality was capable of being used without any serious complaint. It was rather when the quality was below 420 B.Th.U. that people began to complain. This was due to the apparatus being largely adapted for the use of gas of a higher grade. If the apparatus could be readjusted in some way to suit the difference in standard, then a lower grade than even 400 B.Th.U. could be used.

Mr. MACDONALD (Prestonpans) said he had seen the process at Fife; and he was very much struck with it. He thought there was a great future for it. He had been trying to work-out some figures which had come to him from a small gas undertaking in England, where they were working on this type of plant. With the Tully plant they were making 40,000 c.ft. per ton, and were selling at 7s. 6d. per 1000 c.ft. After deduction of the oncost charges for coal and labour, there was a credit balance of £12 10s. on the yield per ton of coal. This contrasted most favourably with the former *régime*, when they had a make of 10,000 c.ft. per ton, which, selling at 7s. 6d. per 1000 c.ft., yielded £3 15s., *plus* residuals, £4 5s. From this there was a deduction of £3 10s. for coal and labour. The prospect held out by the Tully plant, in view of these figures, was altogether a rosy one. They saw gas burning in Kelty on Thursday in a cheap incandescent burner, such as any consumer would be disposed to test the quality of the illuminant by. They saw it burning also in an ordinary gas-ring, with a very small air opening. In this instance it was giving what he would describe as quite a decent flame. The gas was tried, too, on one of Mr. George Helps's adjustable burners. It gave them what could be accurately described as a soft intense flame. Altogether he was convinced, from the evidence shown to him in Fife, that the Tully type of plant held out a great promise for the future.

Mr. J. O. SCOTT (Messrs. Alder and Mackay) said, like the others who had discussed the point, he should not personally like to see any alteration in the status of the Waverley Association. So far as the meter question was concerned, he would merely refer the members to the investigation that had been going on for some considerable time back, and to the report which was placed before the Institution of Gas Engineers at the recent meeting. It would repay members if they studied this report, which had been prepared by authorities who could deal with the subject more ably than he could. The meter manufacturers were continuing to afford the Investigation Committee on the Life and Work of Dry Meters all the assistance they possibly could.

Mr. JAMES RICHMOND (Penicuik) remarked that, in listening to the preceding speakers, the feeling had grown in upon him that he was becoming so antiquated he could scarcely follow the modern ideas that had been enlarged upon. He had a longing, a lingering, and a fond hope to see a coal gas supplied of good quality rather than the modern substitute which they were manufacturing in its name. About seven or eight years ago, in a few articles he contributed to a trade journal, he pointed out the deleterious effect which was likely to ensue, and which had indeed ensued at that time, to pipes, mains, and other appliances in consequence, as he attributed it, to the diminution in the quality of gas. He contended that the purification and other chemical action that was going on was exercising an injurious effect on the pipes and mains. From the observations that the President had made in the course of his address that forenoon, he evidently was just beginning to feel the evil effects. This was not at all surprising, since other gas managers throughout the country were experiencing the same thing. They had only to open their trade journals week after week and read the articles and references to corrosion of services, corroded mains, the heavy oncost for repairs and such like in order to appreciate the situation. Independent of all this, his contention was that, with things as they were at present, they could not give consumers the same satisfaction as they previously did, nor could they guarantee the former supplies of gas with the existing appliances. Appliances must be altered to suit the varying conditions if they were going to reduce the quality of the minimum standard of gas as some managers advocated. He had been particularly interested to hear all that had been said that day respecting the Tully plant and process. It was now many years ago since he first met Mr. Tully, and since those early days it was evident he had plodded on conscientiously in an earnest desire to perfect his process. No doubt, from a gas manufacturing point of view, Mr. Tully's plant had been eminently satisfactory. Of course, there was always bound to be a differentiation between gas and coal gas. He noticed that the President dealt in his address with leakage, and unquestionably this was a subject that required consideration. Leakage was a serious matter, because of the fact that it was a continuing thing. A leakage of 1 c.ft. of gas per hour for 24 hours of the day was approximately equal to about one ton of coal per annum. The natural inference from this was that if they saved on their leakage 1 c.ft. of gas per hour they were, approximately, saving the value of a ton of coal per annum in the balance-sheet. The President mentioned his method of jointing, which no doubt from the practical point of view was much appreciated by them all. At the same time, he was bound to express his own personal opinion that he saw no necessity for a combination of molten lead and lead wool. Further, he did not subscribe to the President's dictum that cast-iron pipes were to be regarded as far from the new ideals of gas distribution. From a long experience of all kinds of piping, he had come to the conclusion and conviction that cast iron was really a wonderful substance, and that there was nothing to beat it as a pipe for gas or any other purpose. A good cast-iron pipe placed in suitable land was practically indestructible. Steel mains had only a limited life, and they were apt to go wrong long before cast-iron pipes. The President struck a somewhat disappointed note when he regretted the inability of some works to go in for modern ideas and modern plants. It was perfectly obvious that the whole policy of gas management was in the melting-pot at the moment. But, speaking for himself, he would not regret having failed to go in for a modern plant until he knew precisely what the plant or process was to be. The one thing essential at present was the need for more information. The total gasification of coal had been set down as a solution of the problem. But was there not a limit to the economy of total gasification? Indeed, at a meeting he attended some time ago he heard a statement made that total gasification did not pay. The suggestion was made that there was a certain limit up to 20,000 c.ft. per ton that was profitable, but beyond this the gas lacked the residuals that made its manufacture a paying investment. Consequently, he doubted whether total gasification would come in general vogue. In this connection it occurred to him to venture a suggestion that might prove advantageous. In the statistical returns which were obtained from year to year, and which were published by the various Associations, could not another column be introduced stating the carbonizing process in use? They could then compare a modern works with vertical retorts making 40,000 c.ft. of gas per ton, and selling it at 2s. 8d. per 1000 c.ft. alongside another works of similar dimensions in which horizontal retorts were installed and where gas was sold at 2s. 6d. per 1000 c.ft. or *vice versa*. [Laughter.] If they could get their statistics placed before them in this informative and detailed fashion, it would be most useful in making comparisons. After all, it was the £ *s. d.* of gas manufacture they had to look to.

Mr. KELLOCH (Airdrie) observed that he was at one with Mr. Cowie and others who had spoken in resisting any innovation likely to impair or prejudice the efficiency of the Waverley Association as it stood at present. The President had cleverly introduced into his address matter of practical interest that had given rise to a profitable discussion. He had listened very attentively to the observations that had fallen from Mr. Richmond. Some of this gentleman's points had been very solid; and they could hardly refute a few of the statements he had made. Very particularly and strongly Mr. Richmond had given them his views on cast-iron pipes; and he agreed with these opinions. To his way of reasoning, cast iron took a lot of beating. Quite recently he laid down a new 12-in. main. At the time he debated within himself whether he should try steel in preference to cast iron. In the end he decided to go on with cast iron; and he had not regretted his choice. In an old street they encountered with a steel main all sorts of complications and difficulties with the sewer, water, and telephone services; but with cast-iron piping they could surmount these troubles much more readily and easily. At the same time, he was not blind to the inherent good points of steel; and in connection with the housing schemes in Airdrie, where they were breaking-up what was practically virgin soil, he was making use of steel with what he considered to be satisfactory results. On the subject of the detection of leakage, experience had shown him that one good method was to make a systematic and regular comparison of all the consumers' accounts. He had spent many hours poring over the survey books for one quarter and comparing the entries with the corresponding quarter of the preceding year. Where he saw an abnormal increase or decrease in consumption, he was always at pains to find a reason for the circumstance. If a reasonable explanation was forthcoming the meter was allowed to remain; but if not, the meter was promptly called-in and tested. In this way he found in time that he was able to considerably reduce his leakage account. He put this suggestion forward as quite a useful one to managers of the smaller works where they had a chance of testing meters. Mr. Vass had dealt very exhaustively with the Tully plant. At the moment, his sympathies were tending in this direction; but as he had no data or statistics to guide him, he must simply learn from the experiences of others. Friends of his own in England had been introducing plants and processes of this description; and once these had been thoroughly set going, he hoped to be in possession of such data as would permit him to judge how the scheme would apply to his own undertaking. He appreciated the President's reference to the scope and usefulness of the Commercial Sections. These sections were doing good work; but sometimes he feared there was what he might call a lack of confidence at the top. That was to say, those who could give information likely to be helpful to the smaller undertakings and enterprises were inclined to withhold their experience. Now the spirit of the Commercial Section was not that. The Commercial Sections were intended to help all in the industry. When the man at the top did something good, he generally spoke at length about it. But it would be much more helpful if he would place on record his failures and disappointments as well, so that others could benefit by the experience. He was rather sorry to hear that the President's works had not come under the sliding-scale for tar. In Airdrie, they had also been laggards in this way; but it was about to be remedied, with, he hoped, material benefit to all concerned.

Mr. CHALMERS (Falkirk) said the President's comment on the greater number of new diaphragms now required was of interest. His own experience had gone to show it was not so much the diaphragm that went wrong as the deterioration of the tinwork in the interior of the meter. So far as the B.Th.U. value of gas was concerned, he did not think it mattered much whether they gave 400 or 450 B.Th.U. The chief thing was to keep the standard constant. In Falkirk, of late he had been working on a serious attempt to make his own dwelling-house an all-gas residence; and, in spite of the fact that gas was costing there 5s. 9d. per 1000 c.ft., he found the expenditure compared most favourably with that of coal. Experience had shown him that what was most urgently required was a gas of uniform standard or quality. Whether it was eventually to be a standard of 500 or 300 B.Th.U. was not a vital question. The chief thing was to keep the quality uniform, so that the consumers would actually know what they were doing. If this course were followed, then he felt sure universal satisfaction would be the result.

Mr. R. J. PHILIP (North Berwick) said that most of the members of the Waverley Association filled in a statistical statement once a month for the Commercial Section. Personally, he was most particular about giving all the information asked for; but he found that some of the members he was anxious to get statistics from had either omitted to fill up certain entries or had forwarded no return at all. If they could have three meetings annually of the members in the

Waverley district, these statistical matters could be discussed round the table and much more valuable information could be exchanged than was possible through the medium of the returns. He would like members to keep this point before them, as the Committee were anxious to draft a scheme that might prove acceptable all round.

Mr. ALEX. DOW (Galashiels) remarked that the subject that was uppermost in his mind at present was the Tully plant; and he was going to reiterate the remarks of some of the other speakers that, to his way of looking at things, there was a great future for this type of plant, particularly in the smaller works. So far as the larger gas undertakings were concerned, he was inclined to the belief that the vertical retort system would continue to hold the field. So far, he had not been privileged to see the Tully plant in operation; but the description given by Mr. Vass was most interesting. He had heard certain reports from Fife in relation to the quality of the gas, and these accounts were not altogether rosy. At the same time, he was optimistic enough to feel assured that, when the adjustments were made, things would turn out all right. In Galashiels, he was gratified to say they had not a very high leakage. There they had lead services in the mains; and, personally, he had a preference for these.

The PRESIDENT, in a brief reply, said he seemed to have been well beaten in his suggestion about the *status* of the Association. The rule, as it stood, was rather inconsistent; and this was his chief reason for suggesting the change. The discussion that had centred round the Tully plant proved distinctly informative and profitable. In the near future he believed this type of plant would appear in a good many of the smaller gas-works of Scotland, as a means of reducing the heavy labour costs more than anything.

THE PRESIDENT'S MEDAL.

The proceedings of the meeting were brought to a close by a presentation to the retiring President of the gold medal of the Association. The gift was handed over in felicitous terms by Mr. R. J. Philp, the President-elect. Mr. Hamilton appropriately acknowledged.

Subsequently the members partook of dinner in the Cockburn Hotel, under the chairmanship of Mr. R. J. Philp.

VISIT TO THE NEWBATTLE COLLIERIES.

Following the routine business at the annual meeting a considerable representation of the members of the Waverley Association accepted the invitation of the Lothian Coal Company, Ltd., to pay a visit of inspection to their collieries and works. Motor 'buses were placed at the disposal of the party, and the run to Newtongrange—traversing as it does a charming part of Edinburgh and its suburbs—was keenly enjoyed.

The coal seams in Newbattle were worked till the Reformation by a long line of abbots, who may be described as the first coalmasters and mining engineers in Scotland. From the Reformation, the coals in Newbattle were worked by the Lothian family up to 1890, when the late Marquis of Lothian granted a lease of them to the Lothian Coal Company, which was formed in that year—the late Marquis of Lothian being Chairman, with the late Mr. Archibald Hood as Managing Director. Mr. James A. Hood, his son, now occupies the dual office. The area of the coalfields held by the Company is about 13,000 acres. This considerable coalfield is reached by pits at Whitehill (Rosewell), Polton, and Newbattle. The seams in the lower series exist under nearly the whole of this area; but those in the upper are more limited in extent. The former are worked from Newbattle Collieries; the latter, in the meatime only from Whitehill and Polton. The Newbattle Collieries are situated about nine miles south-east of Edinburgh. Lady Victoria Pit is provided with machinery capable of drawing an output of 1500 to 2000 tons a day.

The whole surface works are lighted by incandescent lamps, supplied with gas manufactured at the Company's own works at Newtongrange, from which the colliery villages and neighbourhood are also supplied. Where light is required underground, electricity is used.

Bye-Product Coking Plant Gas for Towns.

Some of the opportunities afforded by the bye-product coke industry in the way of supplementing the natural gas supply were pointed out by Messrs. Ramsburg, Sperr, and Becker in a paper presented to the Natural Gas Association of America. According to them, the first bye-product coke-ovens built to supply gas for domestic purposes began work in Boston about twenty years ago. Now, the annual consumption of this fuel for domestic and industrial purposes (outside of iron and steel plants and other establishments with which the bye-product coke plants are directly connected) is approximately 40,000 million c.ft.; and indications are that this amount will be greatly increased the next few years. A list is given of fourteen cities which obtain either all or a large part of their gas supply from bye-product coke-ovens. It is estimated that the average normal consumption of coal for the manufacture of coke during the next five years will be approximately 86 million net tons per year. If all this coal were coked in bye-product ovens, there would be a gas yield of 10,500 c.ft. per ton, or a total production of 900,000 million c.ft. per annum. This figure represents the maximum possible gas production in connection with coke manufactured at the present average rate; but the ideal condition has not been reached when every ton of coke is made in bye-product ovens. Of the 86 million tons of coal used for the manufacture of coke, it may be estimated that, during the next five-year period, 46 million tons per annum will be coked in bye-product ovens, with a total gas production of 480,000 million c.ft. With the development of the modern regenerative oven, a high degree of heating efficiency has been obtained, and the records of a number of Koppers plants show less than 40 p.ct. of the total gas used in coking the coal. The remainder of the gas, amounting to from 6000 to 7000 c.ft. per net ton of coal charged, is available for use outside the plant.

CORRESPONDENCE.

[*We are not responsible for opinions expressed by Correspondents.*]

The Institution Proceedings.

SIR,—Would you allow me space to correct the report of the remarks made by me in connection with the discussion of the reports of the Gas Investigation Committee?

The second paragraph attached to my name on p. 630 should read as follows: "In order to have suitable carbon monoxide, carbon dioxide, and steam hydrogen ratios in your oven furnace, to prevent the steel scaling, you should pass in only sufficient air . . . . With regard to the inerts. The gas-fire is not a very high temperature appliance—the average temperature approximating to 800° C. At this temperature, with a gas containing 50 p.ct. coal gas and 50 p.ct. nitrogen, the Committee have to record a drop in efficiency of 9 p.ct.; and such a gas used at 1200° C. would show a very much bigger drop."

Warrington, June 11, 1920. HAROLD HARTLEY.

Mr. George Helps's Proposals.

SIR,—As is well known, I have for the past four years been frequently in touch with different Government departments and their experts—many gas undertakings and their engineers have entered into agreements with me—hundreds of engineers and others have discussed my proposals with me and seen my demonstrations—over two thousand engineers and others have attended my public demonstrations—I have written and spoken freely on my subjects—so that it is a little late in the day for the President of the Institution of Gas Engineers to come along and kindly appropriate many of my proposals as his own and fantastically pervert others. And all this without, I believe, being able himself to lay claim to the least practical experience in the manufacture, use, and distribution of town's gas.

I do not mind Sir Dugald Clerk using my previously-chronicled ideas as his own in regard to such matters as carbonization, complete gasification, effect of inerts, &c., in a Presidential Address which is not open to an *viva voce* discussion, and which incidentally is instantly, if not previously, issued to the country at large by means of the Daily Press, because the ultimate effect will be to help the industry along, give Sir Dugald Clerk further honours, and do me no harm.

When, however, it comes to putting such statements into my mouth as the following, it is difficult for me to imagine that Sir Dugald Clerk has read me at all; and I think that I shall not have to ask him in vain for the source of his information.

1.—"I have carefully studied his (Mr. Helps's) proposals as they appear in his weekly journal and in his lectures and utterances reported in the Technical Press. I have also read through the various patent specifications in which he describes his inventions. I must confess I find it difficult to discover in any precise way in what manner Mr. Helps intends to reduce his fuel consumption and increase the thermal efficiency. It is plain, however, that he attaches special value to the presence of large quantities of inert gases in the gas which he would supply."

2.—"Mr. Helps appears to consider, however, that many of the advantages of a high-efficiency gas can be obtained by adding atmospheric air to ordinary coal gas distilled from coal in a retort in the usual way; and, moreover, he draws conclusions as to low thermal value gas from mixtures of such gas and air."

3.—"He considers atmospheric air an inert body practically, and reasons accordingly. This procedure is quite erroneous."

4.—"I appreciate Mr. Helps's enthusiasm and good intentions; but here he is quite wrong. He does not assist the gas industry by such reasoning."

5.—"Atmospheric air is not an inert body, nor the equivalent of an inert body, but a necessity of combustion. Without it gas cannot burn, and without it no heat can be evolved by the use of gas."

6.—"The Research Committee of the Institution have exhaustively determined the effect of these inerts; and broadly the addition of nitrogen up to 30 p.ct. interferes but little with the value of a gas for producing heat and light.

7.—"Weak producer gas of about 130 B.Th.U. does not give high enough flame-temperature, &c. It is here that the fallacy becomes evident of comparing mixtures of gas and air of low calorific value per cubic foot with gases of similar low calorific value, due to the presence of true inerts measured before admixture with air. Such low calorific value gases will not incandesce a mantle effectively, while the gas and air mixture will do so."

8.—"The question of distribution must not be forgotten, as appears to be the case when some engineers propose a type of producer gas of the low thermal value of 200 B.Th.U. With gas of about 500 B.Th.U. the distribution charges are nearly equal to the factory charges in the case of the three Metropolitan Gas Companies; so that any reduction of heating value as drastic as a fall from 500 to 200 would lead to greatly increased distribution costs. However, this is a matter which I need not discuss; and it is doubtless fully evident to all competent gas engineers. A gas of 400 B.Th.U. is very desirable from this point of view."

9.—"While on the question of inerts, it is desirable to consider the flame-temperatures of gaseous mixtures. Mr. George Helps appears to attach special importance to the presence of a very large proportion of inert gases (such as nitrogen and carbonic acid); and he seems to consider flame-temperature as practically independent of such dilution. If this be his view, it is clearly incorrect."

I affirm that I have never spoken or written anything to which such ridiculous and absurd interpretations could be given as those referred to in Paragraphs 1, 2, 3, 4, 5, and 9.

I cannot bring myself to imagine, even with such statements before me, that Sir Dugald Clerk, a Fellow of the Royal Society, would for

any end use the tactics of the ancients and all-time history by putting false words into the mouth of his enemy (for the nonce), the better to ridicule him.

I have published very definite statements and diagrams in connection with the many basic facts that I have put forward on the matters concerned over the past four years. I rely on my published patent specifications and the records of the Technical Press, as well as the large number of engineers who have visited Nuneaton and kept in touch with my work for years, for the priority of my proposals as well as their form and correctness; and in addition I have the correspondence with the Munitions Inventions Department, Board of Trade, &c.

I have published two distinct diagrams, each of which shows that I have not treated the air as an inert in the sense alluded to; nor have I ignored flame temperature and volume of inerts. I am sending these to Sir Dugald Clerk.

It will be very much appreciated if Sir Dugald Clerk, who has done me such signal honour already, will add to it by informing me through your columns of the source from which he derived such delightful, and to him seemingly useful, information of my abilities.

GEORGE HELPS.

Nuneaton, June 10, 1920.

P.S.—Pars. 6, 7, and 8 are not put into my mouth; but they have a bearing on my well-known proposals. I need not discuss a practical matter such as distribution (Par. 9) again just now.

Motor Users and Benzol Production.

SIR,—There is an interesting article in your issue of June 8 with regard to the demand for increased benzol production and the various steps taken and suggested to this end.

The writer of the article takes exception to the action of the motoring organizations in approaching the Board of Trade on the subject of gas scrubbing under the new Act. From his point of view, this is a perfectly legitimate attitude to take up. But when he goes on to say that a much better plan would be to stimulate benzol production in this country, he is speaking in obvious ignorance of what has already been done in this respect.

After the declaration of the armistice, benzol producers were absolutely at their wit's ends as to how to dispose of their product. They had no means of distribution, and the public, owing to sad experiences in the past of inferior product, were intensely prejudiced against benzol as a motor fuel. The situation was taken in hand by the Automobile Association, who for over twelve months conducted a campaign in favour of home-produced fuel—a campaign which included the widely-known 10,000-mile test, which has been described as the most complete and convincing test of its kind that has ever been conducted. Further, it approached the Home Office, and got the restrictions as regards storages considerably modified, so that the public should be able to store in 50-gallon drums. In addition, the Association purchased a number of drums for the use of their members, at a time when packages were absolutely unobtainable by the producers.

The result of this campaign is shown by the fact that the demand for benzol is so great to-day that the producers are now at their wits' ends to obtain supplies. This position is entirely due to the action taken by the Automobile Association; and we do not consider it unfair, therefore, that an industry with such a potentially large production should not do its part in helping the whole community. I say the whole community advisedly, because everyone to-day is directly dependent for the necessities of life in one form or another on motor road transport.

By the way, may I point out an error at the beginning of the article in question? The deputation which approached the Board of Trade was a deputation of the Motor Legislation Committee, which comprises the following organizations: The Automobile Association and Motor Union, Society of Motor Manufacturers and Traders, Agents Section, Ltd., Auto-Cycle Union, Association of British Motor & Allied Manufacturers, Ltd., Institute of British Carriage and Automobile Manufacturers, Scottish Motor Trade Association, Cycle and Motor Cycle Manufacturers and Traders Union, Ltd., Motor Trade Association, and Association of Agricultural Engineers.

In addition to these organizations, the Royal Automobile Club and the Commercial Motor Users Association sent representatives to form part of the deputation. From the quotation in the article in question, it would have seemed that the deputation represented the R.A.C. and C.M.U.A. only, whereas the facts are as stated above.

ROBERT H. MONTGOMERY,
Automobile Association and Motor Union.

Fanum House, Whitcomb Street, W.C., June 11, 1920.

New Joint-Stock Companies.—Among the latest registrations of joint-stock companies are Synthetic Ammonia and Nitrates, Ltd., with a capital of £5,000,000, in £1 shares, and Middlesex Gas-Mantles, Ltd., with a capital of £20,000, in £1 shares.

Purifier Grids Fired by Lightning.—During Saturday's heavy thunderstorm, lightning set fire to a large quantity of purifier-grids at the works of the Tottenham District Light, Heat, and Power Company. The staff and the local fire brigade worked hard, and after several hours all danger of the outbreak spreading was past. There was fear at one time of the buildings at the works becoming involved.

Gas-Workers' Strike at Melbourne.—In consequence of their demands for a large increase in wages not having been immediately conceded, the gas workers at Melbourne, Brighton, Williamstown, and Footscray ceased work. The Government promptly intervened; and an appeal was issued to the citizens to replace the strikers. According to a message through Reuter's Agency, the Companies offered 13s. a day; but the demand of the men is for 14s. There was a fine response to the call for volunteers; and when the last messages left the Melbourne Metropolitan Gas Company were hoping to give a modified supply to consumers.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official List" for June 9]

Nos. 14,712—15,289.

AMERICAN SMELTING & REFINING CO.—"Making sulphur from sulphur dioxide." No. 15,121.
BENTLEY, W.—"Gas heaters, &c." No. 14,848.
BONE, W. A.—"Manufacture of coke." No. 15,194.
CASH, T. H.—"Gas igniter." No. 14,931.
CONROY, T. M.—"Connections for pipes, &c." No. 15,057.
CUTLER, S.—"Superheaters for complete-gasification plant." No. 14,908.
EVANS, I. B.—"Regulating-valves for gas-producers, furnaces, &c." No. 14,959.
FRAZER, J. K.—"Gas scrubbing and washing apparatus." No. 15,266.
GREENWOOD, A.—Gas blow-lamp," No. 15 250.
HARPER, SONS & BEAN, A.—See Conroy, T. M. No. 15 057.
HOLDEN, G.—"Device for igniting gas." No. 14,825.
KILLING, K.—"Cylinder for inverted incandescent gas-lamp." No. 14,881.
M'DONALD, T. F.—"Gas-turbines." No. 14,824.
M'HUGH, M.—"Domestic gas cooking-rings." No. 14,720.
NASEBY, T. W.—See M'Donald, T. F. No. 14,824.
NEWBERRY, H. S. See Cash, T. H. No. 14,931.
RICHMOND GAS STOVE AND METER CO.—"Gas heaters." No. 14,924.
ROBERTS, J.—"Manufacture of coke." No. 15,194.
ST. LEGER, A.—"Gas heaters." No. 14,924.
SIMONS, W.—See Evans, I. B. No. 14,959.
STEVENS, R. H.—"Incandescent gas-mantles." No. 14,980.
STEWARD, S.—"Gas cooking-stoves." No. 14,961.
TRAUBE, W.—"Recovery of ethylene from gaseous mixtures containing it." No. 15,192.
UMPLEBY, F.—"Gas producers and/or retorts." No. 15,152.
WARD, P. W.—"Gas distributor for incandescent lights." No. 15,254.
WHITTINGHAM, F.—See Steward, S. No. 14,961.

Barrow-in-Furness Gas-Works Results.

At a meeting of the Barrow-in-Furness Town Council on Monday of last week, the Gas Committee recommended that the price of gas should be increased from 4s. 6d. to 5s. 6d. per 1000 c.ft. In moving the adoption of the report, Alderman Brown made reference to the results of the working for the year ended March 31. Compared with the previous twelve months, they had sold 60,115,000 c.ft. of gas less; and the receipts were down by £10,283. Owing to the stoppage of war material manufacture, the consumption of the large works had decreased by 58 p.ct. There was, however, an increase of general income of 5 p.ct. Receipts from residuals were more than last year by £4694. The result was that the net income was down from £116,972 to £111,383. On the expenditure side, they had paid £5366 less in purchasing oil for the manufacture of carburetted water gas. General expenses had increased by £12,584, chiefly in respect of coal, wages, and income-tax. The coal bill was up by £3210, though they had carbonized 2118 tons less. Wages were more by £4740. The net result of the working of the department, after providing for the statutory repayment of loans and interest charges, and setting aside £8343 for the renewal of works and plant, showed a loss of £3325. Last year, when the whole of their plant was working at its utmost capacity, the profit was £9482. The quality of coal had been very poor; but, notwithstanding this, the make of gas per ton of coal throughout the year at the Salthouse works averaged 15,203 c.ft., and at the Hindpool works 13,091 c.ft., making an average for the two works of 13,568 c.ft. The results at Salthouse were 2200 c.ft. more gas per ton than the guarantee given when the Council decided to instal them in the new works; and the Hindpool Road works' output was above the average result given by the horizontal retort system in other parts of the country. Next year it was anticipated that, including the recouping of the loss for the past year of £3325, they would have to find an additional sum of £15,200. This could only be done by increasing the charge to the consumer; and the Committee recommended the increase of 1s. per 1000 c.ft. The proposal was criticized by Mr. Barrie, who contended that there should have been economies when there was such a heavy reduction in sales. Mr. Longstaff and Mr. Morton submitted that the users of gas by prepayment meter should have the same value as those with ordinary meters; and on a vote this was agreed to by 15 votes to 14. The increase in the price was carried.

Gas-Works Fire at Salford.—For some time last Friday the brigade were engaged in dealing with a fire which had broken-out in one of the purifiers at the Liverpool Street Gas-Works of the Salford Corporation. Fortunately, the gas supply to the purifier had been turned off when the fire broke out.

Bolton District and Gas Workers.—In Bolton and district the gas-workers' application differs slightly from the national demand; and it has been referred by the Town Council to the Federation of Gas Employers. The local ballot resulted in 392 of 399 papers sent in being in favour of a stoppage. There are 600 men in the Union; but many are absent in summer time, when the industry is not busy. The Bolton branch asks for an advance of 10s., and an extension of holidays in the case of "seven days" men to fourteen and "six days" to twelve. Before the war vertical stokers were paid 36s. a week, machine stokers 32s. 6d., numerous other grades slightly less, and ordinary labourers 26s. There had been added a war-wage advance of 33s. 6d., *plus* 12½ p.ct., making the vertical stokers' earnings £3 18s., machine stokers £3 14s. 6d., and ordinary labourers £3 7s., based on a six-day week. An effort is being made to bring the Farnworth Gas Company to a level with Bolton and other districts.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

Progress of Bills.

The Dumbarton Burgh Gas Order Confirmation Bill was brought from the Commons, and read the first and second times.

It was reported that the further Standing Orders applicable to the Redcar Urban District Council Gas Bill had been complied with.

The South Suburban Gas Bill was read the third time, passed, and sent to the Commons.

A petition against the Redcar Urban District Council Gas Bill has been presented by owners and occupiers of property and consumers in the urban district of Saltburn and the parish of Marske.

HOUSE OF COMMONS.

Progress of Bills.

The Watford Urban District Council have withdrawn their petition against the Gas Provisional Order (Watford Gas) Bill. The Bill was thereupon referred to the Committee on Unopposed Bills.

It was reported that Standing Orders not previously inquired into had been complied with in the case of the South Metropolitan Gas Bill.

A petition of Shareholders of Gas Companies in favour of the Gas Regulation Bill was ordered to lie upon the Table.

The Fertilizers (Temporary Control of Export) Bill was read the first time.

The Gas Regulation Bill was read a second time [on Tuesday], and committed to a Standing Committee.

The South Suburban Gas Bill was read the first time, and referred to the Examiners.

The Gas and Water Provisional Orders Bill, the Gas Provisional Orders Bill, and the Wandsworth, Wimbledon, and Epsom District Gas Bill were reported, with amendments.

The following notice of motion has been given by Mr. Gilbert and Mr. Purchase: "On second reading of South Metropolitan Gas Bill [Lords], to move—That, as the Gas Regulation Bill which has been introduced by the Government to provide a remedy for any difficulties experienced by gas undertakings due to conditions arising out of the war has passed second reading in this House, and will be immediately considered by a Standing Committee, this House declines to proceed with the second reading of the South Metropolitan Gas Bill, which seeks to deal separately with matters which can be more appropriately dealt with under the provisions of the Gas Regulation Bill."

Local Authorities (Payment of Expenses, &c.) Bill.

A Bill has been introduced into Parliament to provide for the payment of certain expenses, and the making of certain allowances, in connection with local authorities and other public bodies and their committees. Under it every member of a local authority or any committee of a local authority shall be entitled to receive his travelling expenses necessarily incurred in attending meetings of the authority or any committee thereof, and an allowance at prescribed uniform rates in respect of other personal expenses necessarily incurred and time necessarily lost in attending such meetings. The expenses and allowances shall be paid by the local authority out of such fund as they may determine, with the consent of the Minister of Health. No portion of such expenses or allowances shall be paid, directly or indirectly, out of moneys provided by Parliament. The expression "local authority" means any municipal corporation, board of guardians, port, harbour, dock, or river authority, and borough, county, or district council (whether urban or rural). Nothing shall affect any power of a local authority to pay any fixed salary or make any fixed allowance to any member which might have been exercised if the Act had not been passed; but where a member of a local authority receives such fixed salary or fixed allowance, he shall not be entitled to receive any expenses or allowances under the Act.

Export Licences for Coal-Tar Products.

Mr. BRIDGEMAN (the Parliamentary Secretary to the Board of Trade), replying to a question by Mr. Kiley, addressed to the President of the Board of Trade, said that applicants for export licences for certain coal-tar products were required to produce a certificate from the actual manufacturers to the effect that they could supply the quantity of goods in question for export without detriment to their deliveries to domestic consumers. It was obviously in the interests of the export trade generally that the requirements of users of these commodities in the United Kingdom should be supplied so far as practicable.

Gas Undertakings Returns.

Mr. LUNN asked the Parliamentary Secretary to the Board of Trade the amount paid out by the Gas Light and Coke Company in excess profits duty during each of the years 1916, 1917, 1918, and 1919, and whether he could give an early date for the publication of returns of gas undertakings, both public and private, in continuation of parliamentary papers, Nos. 311 and 312 of 1915, in view of the fact that no returns had been published for any of the years since 1914.

Mr. BRIDGEMAN said he was informed by the Gas Light and Coke Company that they had at no time been liable for excess profits duty. The dividends which they had paid to their ordinary shareholders during the war had been on a considerably lower scale than those for some years prior to 1914. Returns for the year 1919 relating to all statutory gas undertakings in the United Kingdom were now being compiled, and would be published as soon as practicable.

Inland Distribution and Decontrol of Coal.

Mr. BRIDGEMAN, replying to a question by Colonel Newman, said that the departmental control of the inland distribution of coal had been terminated. The maximum price at the pit-head continued to be fixed under the Price of Coal (Limitation) Act, 1915; but the Orders regulating intermediate and public prices had been suspended. Consumers would be free to make their own arrangements regarding supplies of coal, subject only to the directions given to collieries by the District Coal and Coke Supplies Committees. It should be borne in mind that the work of these Committees would be helped if consumers would continue to use for the time being their present channels of supply. It was not proposed to abolish the Coal Mines Department; but, as a result of the step now taken, considerable economies would be effected, including the cost of the contributions to local authorities in connection with the administration of the Household Fuel and Lighting Order, which had amounted to £400,000 per annum.

Colonel NEWMAN: Is it the case that coal consumers will not be obliged to accept seaborne coal in future?

Mr. BRIDGEMAN; It all depends on how far it is possible to get coal in any other way.

DIVIDENDS ON GAS COMPANIES' STOCKS.

The Unopposed Bills Committee of the House of Commons presided over by Mr. J. H. WHITLEY (the Chairman of Ways and Means), on Thursday last had before them a number of Provisional Orders relating to gas companies, contained in two Confirmation Bills promoted by the Board of Trade—viz., the Gas and Water Provisional Orders Confirmation Bill and the Gas Provisional Orders Confirmation Bill.

In all there were six Orders, the whole relating to the raising of new capital; and the representative of the Board of Trade who attended mentioned that the sole point in connection with the Orders was the higher rate of dividend allowed, compared with pre-war practice. In three cases, the rate of dividend allowed was 7 p.ct.; in two cases, 8 p.ct.; while in the remaining case, the new capital is to be in the form of preference stock issued at such a rate of interest as the Directors may from time to time determine.

Special attention was called to the Order relating to the Great Marlow Gas Company, in which the rate asked for was 8 p.ct. It was pointed out that this was a small company with such a small existing capital, and a small additional capital asked for, that the money could not be raised at less than 8 p.ct.

The Great Yarmouth Gas Company ask for powers to borrow £120,000 additional capital, and half borrowing powers, at 7 p.ct.

The Mablethorpe and Sutton Gas Company are seeking £6500, with a third borrowing powers, at 7 p.ct.

The Braintree and Bocking Gas Company desire £80,000, with one-third borrowing powers, at 7 p.ct. on the ordinary stock and 6 p.ct. on the preference stock.

The Great Marlow Gas Company require £22,000, with one-half borrowing powers, at 8 p.ct. on the ordinary stock, to 7½ p.ct. on the preference stock, and 7 p.ct. on the borrowed capital.

The Ilford Gas Company are raising £315,000, and one-third borrowing powers. In this case, the whole amount is to be issued as preference stock at such rates of interest as the Directors may from time to time determine.

The Taunton Gas Company require £70,000, with one-half borrowing powers, at 8 p.ct. on the ordinary stock and 7 p.ct. on the preference stock.

In all cases, the auction clauses are inserted.

The Committee sent the Bills forward for third reading.

WANDSWORTH, WIMBLEDON, AND EPSOM GAS BILL.

This Bill, which has already been passed by the House of Lords [see "JOURNAL," March 23, pp. 701-2] was last Thursday before the Unopposed Bills Committee of the House of Commons.

Mr. LEES (Parliamentary Agent) told the Committee there was considerable opposition to the Bill in the House of Lords; but no petitions had been presented against the Bill in the House of Commons. An objection had been raised on second reading; but the tenants of the houses in Merton Road had been satisfied that flats would be built by the Company, which would screen the new gasholders from their view.

The Bill which is to authorize the Company to use land in their possession for the purpose of storing gas, and also to raise £450,000 new capital by preference stock was ordered to be reported for third reading.

Bombay Gas Company, Ltd.

Last Thursday an extraordinary general meeting of the Bombay Gas Company, Limited, was held at Moorgate Station Chambers, E.C.—Mr. H. E. Jones in the chair—for the purpose of confirming the special resolution passed at the extraordinary general meeting held May 13 (*ante*, p. 444). The Secretary (Mr. A. Dickson, jun.) having read the notice convening the meeting, the Chairman moved: "That the Articles of Association now submitted to the meeting, and identified by the signature of the Chairman of the Company, be and they are hereby adopted as the Articles of Association of the Company, in place of the existing articles." Mr. C. H. F. Christie seconded the motion, which was unanimously agreed to.

Federation of British Industries and the Gas Regulation Bill.—There was a good attendance, representative of both industrial consumers and producers, at a further meeting on the 1st inst. of the Committee of the Federation of British Industries appointed to consider what action should be taken with regard to the Gas Regulation Bill. The Bill was examined in detail, and a full exchange of views took place; it being eventually decided that no opposition should be offered on behalf of the Federation. It was stated that the gas industry were proposing certain amendments which would not affect the main principles of the measure.

THE GAS REGULATION BILL.

Second Reading Carried.

In the House of Commons on Tuesday last,

Mr. BRIDGEMAN (Parliamentary Secretary to the Board of Trade), moving the second reading of the Gas Regulation Bill [the full text of which was given in the "JOURNAL" for May 25, pp. 425-7], said it was a measure introduced in response to a great many appeals from gas undertakings, and in accordance with a promise made by the late President of the Board of Trade (Sir Auckland Geddes) that he would carry out the recommendations of the Fuel Research Board with regard to the economical use of coal in so far as gas is concerned. The recommendations of the Fuel Research Board concerning gas were that the standard for charging should be by thermal units instead of cubic feet; and the unit of charge was to be 100,000 thermal units. It was also recommended that there should be a continuous test by standardized machinery recognized by the Board of Trade; that the gas should contain no sulphuretted hydrogen; that there should be a limit to the inert and incombustible constituents—the undertakers to declare the calorific value, and to give notice of any change in calorific value, and replace or adjust appliances; and, lastly, that the pressure was to be 2 in. on any main. These were the recommendations of the Fuel Research Board; and every one of them was being carried out in one or other section of the Bill. It referred to gas undertakings—both local authorities and statutory companies. There were 831 undertakings, of which 312 were carried on by local authorities; and there was £140,000,000 of capital concerned. The companies were subject to certain restrictions; and they had to fulfil certain obligations. The cost of fulfilling these obligations had—owing to the increase in the cost of coal and the increase in wages and general expenses—enormously increased since the period before the war; and although during the war a Bill was carried allowing increased charges to gas undertakings, it was only a temporary measure for two years. Everybody would, he thought, agree that the conditions now were entirely different from those prevailing at the time the companies were established. The same obligations still rested upon them; but the cost of carrying them out was doubled, and it was manifestly unjust that the companies should be subject to the same restrictions, although their obligations had so enormously increased. It was also necessary that confidence should be restored, in order that the companies might get the capital required to carry out their duty—some kind of permanence was necessary. The Bill gave the Board of Trade power not only to alter the standard from one of cubic feet to one of calorific power; but it also enabled the authorities to increase the charges proportionately to the increase of expenses since the beginning of the war. They would have the same profit-earning capacity as they had before the war; and those who worked under a sliding-scale would still work under it, so that the amount of dividend paid above the standard would be regulated by the cheapness of the gas sold—a most excellent system which existed for the benefit of the consumer in a great many other industries. Another provision was that three Gas Referees and one Chief Gas Examiner were to be appointed by the Board of Trade. Local gas examiners would be appointed by the local authorities. If their decisions were appealed against, the appeal would be heard by the Chief Gas Examiner. The expense of carrying out these examinations and tests, and of keeping accounts, would be borne from a fund to be raised by a levy on the larger undertakings. Under the Bill, no concern which did not produce over 100 million c.ft. of gas in a year would be subject to the levy. This covered practically 90 p ct. of the gas used in this country. The larger undertakings would be subject to any levy necessary to carrying out the work. There was to be an advance by the Treasury; but it would not be an ultimate charge on the Treasury—only an advance to pay expenses until the levy was raised and until arrangements had been made for rendering the system self-supporting. [A memorandum on the expenditure likely to be incurred appears on p. 735.] The rest of the Bill contained clauses as to penalties, and enabling certain things to be done by Special Order which were previously done by Provisional Order. There were also general provisions as to fees, and as to the standardization of tests, the standardization of the machinery by which the tests were to be carried out, and as to accounts and rules. In some correspondence he had received, it seems generally admitted that it was a fair measure—the criticisms being aimed not at the main provisions of the Bill, but at details which could be discussed in Committee. He believed the general opinion of the House was strongly in favour of the Bill having a second reading; and he hoped to get it that night. The situation in the gas industry was a very uncomfortable one at the present moment. A strike was threatened in the industry; and the only possible way of being able to pay higher wages would be by some such measure as was now proposed. Unless gas companies were enabled to get a reasonable economic price for what they produced they could not possibly meet the demand for higher wages now being made upon them.

Mr. HAYDAY, while supporting the second reading, reserved his criticisms as to details for the Committee stage. The gas industry was, he contended, in a quite unique position as compared with any other important national industry in this country. The early statutory provisions which reduced the companies' dividends as the prices charged by them increased and increased dividends as the charges to the consumer fell, were no doubt most excellent provisions when they were made; and had they not existed during the war, it might have been necessary to have a fixed maximum price. But he must candidly say that he knew of no industry that had been so handicapped by reason of these very Statutes as the gas industry. There had been constant increases in the cost of coal, with corresponding reductions in the value of the bye-products. This had now reached a point when dividends were at a low minimum, and development was, so far as the companies were concerned, out of the question, because they could not attract new investors. There was another side to the picture, which he would wish to mention in supporting the Bill. It was said that the gas industry was at the moment in a very serious condition because of a threatened dispute. Recently it was asked in the papers why the Government allowed a long period to elapse before they intervened in such matters. During the past three or four months negotiations had been going on. "Let the public know really whether these wages demands are reasonable. If they are, they should be met. Can the undertakings afford to pay? If they cannot, let us know why." There was truth in both these statements. The gas worker, the bye-product man, the man engaged in distribution, had at the moment actually anything from 6s. to 10s. less of war-time advances than the lowest of the national awards yet conceded. Their conditions generally as regards week-end overtime (they were seven shifts a week men—working right through the seven days) were worse by far than in almost any other industry. When an appeal was made for equal treatment nationally for these men with that under the Engineering and Shipbuilding National Awards during the period of the war and up to the present moment, the companies said that if this was forced, it meant cracking-up the companies altogether, because they could not pay but must go into the Bankruptcy Court. On the other hand, there was the point of view of the men who were called upon to face the heat of the retort-house, and all the increases in the cost of living; and yet, because the companies were working under Acts of Parliament, and could not charge for that which they produced a sufficient economic rate, they were unable to give reasonable wages to those whom they employed and a fair profit to themselves. The men said: "Why should we be called upon to pay these extra charges, and yet be restricted so far as our wage returns are concerned?" While giving the Bill a second reading would prevent strike notices going out on Saturday or Monday at the latest, he did hope that the Bill would have a quick passage through the House, and pass into law, so that some arrangement might be made before June 26 to prevent, first, a national stoppage in an important industry upon which manufacture mainly depended in many areas, and also the possibility of the stoppage spreading to the twin industry of electricity, and so causing serious trouble, because of the hardships inflicted both upon the employees and on the companies by restrictive Acts of Parliament, which had retarded progress in this very important national industry.

Major BARNES said it appeared to him rather an extraordinary thing for a measure of this importance to pass through the House without hon. members saying a word upon it. It was one of a whole series of measures to which the House had been giving its sanction—measures dealing with all the great undertakings in the country which were under statutory limitations. These measures dealt with tramways, ports, docks, and harbours, and now there was one dealing with gas undertakings. Everyone in the House recognized that all undertakings which were under statutory limitations were at present passing through a period of very great difficulty through being restricted in their charges. They were not restricted in the matter of increased costs, and so were all in a very critical financial condition, which led to very great difficulty in dealing with the authorities who were running the undertakings and the workmen employed by them. Every member must be willing that these undertakings should be extricated from such a position. He had not risen to speak in any degree in opposition to such a proceeding, but to point out that in the Bill the Government were proceeding to treat gas undertakings differently from the way other undertakings had been treated. He thought the Bill was an improvement upon some of the Bills that had already come before the House. In the first place no distinction was drawn between undertakings belonging to local authorities and those which did not. This distinction had been drawn in connection with Tramway Bills and in regard to the Electricity Bill; and members had protested against the distinction. He contended that all such undertakings, whether they belonged to local authorities or not, should be treated in the same manner; and so he was glad to see the Government had recognized this principle. He could not imagine that the Government desired to treat one class of undertaking differently from another; and so it might be reasonably expected that the Bill indicated their intention to put all such undertakings belonging to local authorities on the same footing as those which did not. He did not know whether the House realized that the Bill proposed to do what in a great many other directions the House had already resented and disapproved of—that was, to take the parliamentary powers which it had exercised in the past and invest them in the Board of Trade. Why, he asked, had there been a difference instituted in this Bill in that direction? All the other measures had been merely temporary measures in connection with tramways and docks and harbours—vesting in the responsible Minister for the time the power to make modifications in charges, and leaving it open at the end of a period of two years or more for these undertakings to come before Parliament in the ordinary way to present their Bills in order to make their charges permanent. In other words, power was taken from the House, and bestowed on the Minister simply for a period of emergency. Under this Bill all the powers which had been exercised through Parliamentary Committees in the past and through Provisional Orders confirmed by the House were removed from it, and bestowed on the Board of Trade. Thus Special Orders, by the Board of Trade, took the place of Provisional Orders confirmed by the House. This appeared to him to effect a policy which it was to be hoped would be altered in Committee. There was just one other matter, perhaps of greater importance. The Bill was in two parts; the first part dealing with the modification of charges. When it came into operation it would relieve gas undertakings and their employees from the very difficult situation in which they now found themselves. Very little had been said about the second part of the Bill, which might prove the most important part of it. A restriction was to be put upon the manufacture of gas, which might have very serious effects. Up to the present time the manufacture of gas had been under certain restrictions. It was bound not to contain sulphuretted hydrogen, and there were other restrictions. On the whole it had been

fairly satisfactory; but now there was a provision in the Bill that, in addition to these things, gas could not be manufactured or sold which contained more than a certain proportion of inert matter, or incombustibles. This might carry very little information, and make very little impression upon the layman. But those members who had received a pamphlet which had been circulated would, if they had given it any attention, have seen that, in the opinion of some very competent gas engineers, the effect of the restriction was going to be exceedingly serious. The effect of the contention in the pamphlet was that the restriction would prevent cheap gas being made. The argument was that if the restriction was not inserted in the Bill it would be possible for the manufacture of gas to be continued in a way that would allow its sale to be made at one-third the cost that would be necessary under the conditions laid down in the Bill—a serious matter at the present time. The use of gas was a factor in the cost of living; and it was becoming an increasing factor. There was not a home in the country in which it was not used; and the House could not regard with unconcern any proposal which any competent authority said would raise the cost three times. So far as he could follow it, the real reason for the restriction was that it had direct relation to bye-products. If the restriction was inserted, the effect would be that it would ensure a considerable supply of coal tar, whereas if it was not inserted, and the process of manufacture of cheap gas was encouraged, the result would be that the same amount of coal tar as a bye-product would not be secured that otherwise would be got. He realized the importance of an adequate supply of coal tar, forming as it did the basis of the dye industry, and being required for a great many other purposes. But coal tar should not be secured at the expense of the ordinary gas consumer. There should be some provision in the Bill by which, if the Board of Trade were going to impose this restriction, the domestic consumer may be protected. There might be some members who were entirely indifferent to the interests of the ordinary consumer; but the point he was making was one which affected the interests of the great mass of the people. Those who used gas on a large scale in the great industrial works might adopt mechanical dilution, and secure for themselves cheaper gas; but that was outside the power of the ordinary domestic consumer. The hon. member in charge of the Bill had expressed his willingness in Committee to consider and accept amendments. He hoped the Government would be prepared to accept such amendments as would permit gas to be manufactured in conditions which would ensure to the working classes of the country an abundant and plentiful supply of gas.

Sir FORTESCUE FLANNERY said that, as a director of a gas company for something like twenty years, he endorsed on behalf of the gas undertakings generally the action of the Government in having brought in this Bill. As regards the two points which had been referred to by the last speaker, the powers which the Board of Trade would obtain of making Provisional Orders regulating the working of gas undertakings were powers no larger than those which the Board of Trade already possessed in regard to the mercantile marine. They were purely for testing the gas and seeing that it was of a certain quality—protecting the consumer, and confined entirely to certain administrative details of manufacture. The proposed limitations of air and other inerts in ordinary gas had been referred to. This was a provision which possibly would have to be modified in Committee; so that it need not be discussed at the moment. Broadly speaking, the Bill was to substitute for the old-fashioned method of charging by volume the fairer and more honest method of charging by heat-power—the number of heat units in the gas would be the basis of charge. The old system was that, whatever the volume was, the charge was so much per cubic foot, whether the gas was good or bad. So that the new system would surely be a benefit to the consumer as well as to the manufacturer. As someone had spoken on behalf of the gas workers, and another member had spoken largely on behalf of the consumer, he thought it his duty, on behalf of the gas profession generally, to say that the Bill was believed to be for the public benefit, and that there was no objection to its general principles—subject, of course, to amendment in Committee.

Sir F. BANBURY said he did not intend to go into the question whether gas should be made with air or air be made with gas—these were Committee points. He understood (apparently wrongly) that the object of the Bill was to put the shareholders in a better position than they were in now—that, owing to the great increase in the cost of making gas, it was impossible to carry on the gas undertakings at a profit unless some measure of this sort was introduced. He also understood there was a dispute, of which he was unaware, between the gas workers and the companies; and it was in order to give the men higher wages that the consumer would have to pay more for his gas.

Mr. BRIDGEMAN (interrupting) remarked that he merely said it was in order to give the gas companies the same profit-making opportunities that they had before the war. He said that the state of the gas industry was such that there was a strike threatened at the moment; and that it would be quite impossible (whether it was desirable or not he did not say) to raise wages, if restrictions which might have been just before the war were retained.

Sir F. BANBURY contended that the Bill was a proposal apparently to enable higher prices to be charged, in order that some people might get higher wages; but this was a process which would have to come to an end some day. There was also under the Bill the proposed appointment of more officials, who might not have to be paid by the Government; but they would have to be paid by somebody, and the fewer officials to be, the better. There was always somebody to be appointed to interfere with somebody else's business; and he strongly objected to this.

The motion for the second reading was then put and agreed to, and the Bill was committed to a Standing Committee.

The following memorandum on the expenditure likely to be incurred in the event of the Bill passing was issued last Thursday as a "White Paper."

Memorandum on Expenditure Likely to be Incurred.

The Bill empowers the Board of Trade to make Orders in respect of all statutory gas undertakings in the United Kingdom providing for the repeal of any enactments or other provisions requiring the undertakings to supply gas of any particular illuminating or calorific value, and for substituting power to charge for thermal units supplied in the form of gas.

For the purpose of regulating and supervising the testing of the gas supplied under the new conditions, the Board of Trade are required by clause 4 to appoint three persons to act as Gas Referees, and also to appoint a Chief Gas Examiner—thereby extending to the whole country the system which has been in operation in London for many years.

It is intended that the whole of the expenses incurred by the Board of Trade for these purposes shall be borne by the gas industry; and by clause 7 provision is made for a levy upon all undertakings making over 100,000,000 c.ft. of gas per annum, of an annual contribution not exceeding £15 for each 100,000,000 c.ft. of gas made.

The maximum amount leviable under this clause, based on the make of gas in 1919, so far as can be estimated, is £32,000.

Provision is also made in clause 14 under which the Board of Trade may prescribe the payments to be made in relation to applications and other proceedings under the Bill.

As the contributions to the proposed Gas Fund will not be leviable until Orders have been made under clause 1, it is proposed that during the first two years the expenditure shall be paid out of moneys provided by Parliament. But such moneys are to be treated as advances from the Treasury; and it is intended to be provided that they shall be repaid, with interest, within the three next succeeding years.

It is difficult to make an accurate forecast of the annual expenditure; but it is not anticipated that it will exceed £20,000.

Last week, there was a notice of motion standing in the name of Mr. Baldwin: "That, for the purposes of any Act of the present session to amend the law with respect to the supply of gas, it is expedient to authorize the payment, out of moneys to be provided by Parliament, for two years after the passing of such Act, by way of advance to the extent that may be necessary, of the expenditure of the Board of Trade in the execution of their powers and duties under such Act, such instalments in each case to be repaid in the next three succeeding years."

There was also a notice by the Home Secretary instructing the Committee: "To consider of authorizing the payment, out of moneys to be provided by Parliament, of such expenditure as may become payable under any Act of the present session to amend the law with respect to the supply of gas, for remuneration and expenses of Gas Referees for two years after the passing of such Act (King's Recommendation signified)."

LEGAL INTELLIGENCE.

FINE FOR DEFICIENT ILLUMINATING POWER.

Coal Difficulties at Gravesend.

An interesting case regarding the illuminating power of gas supplied was heard at the local Police Court, on Monday of last week, when the Gravesend and Milton Gas Company were summoned for supplying gas defective in this respect on April 28. The Chairman of the Bench was Mr. F. GOLDSMITH.

Calling our attention to the matter, Mr. Joseph Davis (the General Manager and Engineer of the Company) says: "The matter refers to a magisterial inquiry into the quality of gas supplied by us as tested by Mr. Dibdin some six weeks ago. The certificate signed by him stated the gas to be 0·24 candle. Subsequently (probably several days afterwards) he said by calculation that the gas must have been 7 candles. It would be interesting to know by what method of reasoning or calculation he arrived at the latter figure! I may add that the conviction was upon the certificate given in the first instance."

Mr. L. H. W. TROUGHTON (the Secretary to the Company) admitted that the gas was defective in illuminating power, but said he had a statutory defence. The Company were not liable to any penalty if the defect arose through accident or unavoidable causes.

The TOWN CLERK (Mr. H. H. Brown), prosecuting on behalf of the Corporation, stated that the gas had been tested by Mr. Dibdin, a recognized expert, who found, by one method, that the illuminating power was barely 1 c.p., instead of 15. By another method of calculation, not based on burning, the result was something in the neighbourhood of 7 c.p. The Corporation had taken the view that during the war the Gas Company, like other people, had a great many difficulties to contend with; and they thought they would allow some period to elapse to allow the Company to get back to the previous illuminating power. This had not happened. The gas-testing apparatus had to be maintained by the Company; and if there were any defect, it was the Company's business. He submitted that an accident or unavoidable cause meant such a thing as a breakdown of the plant at the gas-works. There was the uncontrovertible fact that the illuminating power was seriously defective. Numerous complaints had been received.

Mr. TROUGHTON said the Company were in much worse trouble than during the war. They had great difficulty in getting coal. On the day of the summons, Mr. Davis was in London trying to buy spirit for enriching, but could not get any. Unavoidable causes did not necessarily mean through accident. The Board realized that it was a wicked waste of coal to supply gas of any illuminating power at all.

Mr. *Joseph Davis* (the General Manager and Engineer of the Company) stated that on the day of the test he carbonized 34 to 35 tons of coal, and had seven days' stock of coal in hand. They were communicating with the Controller to get some coal. The stock went down to three days' consumption. To prevent the town being in darkness, they had to get all the gas they could out of the coal—stretch it to the utmost. At that time they had no enriching material in the place; and the water-gas plant was out of order. The coal they were

getting was very bad. It would have been impossible to get worse. It was full of dirt; and there was a large percentage of ash. He went to London on the day of the test to try to get benzol or carburine spirit. Undoubtedly, it was a wicked waste of coal to supply gas of high illuminating power; some companies supplied on calorific value alone. The deficiency was from an unavoidable cause, as they had not the stuff to make it from. One could get a better light with a mantle from a 6 c.p. gas than from a 20 c.p.

The TOWN CLERK: If people who cannot afford mantles do not get 15 c.p., they are not getting what they are entitled to from their flat-flame burners?

Witness: There is no other way of putting it. During the war instructions were given not to supply it at that candle power.

You have been working more on the heating standard than the illuminating. Do you intend to go on neglecting the standard laid down by the Act of Parliament until the new standard comes into force?—As far as I am concerned, yes.

Do you think it is right to anticipate legislation in this way?—It is not anticipating; it is in existence.

The TOWN CLERK: Not as regards your Company.

Further cross-examined, witness said they were expected to have six weeks' stock of coal in hand; but he could not get it.

The TOWN CLERK: If you had these enrichers would you set-up to give a 15 c.p. gas?

Witness: No.

The TOWN CLERK: Then you have thrown the Act over?

Mr. TROUGHTON: Is it possible to supply 15 c.p. at the present time?

Witness: It cannot be done.

Are you working by calorific power because you cannot get the other?—Yes.

Mr. TROUGHTON stated that the Coal Controller would not allow them to buy coal in large quantities except from one firm.

By the CHAIRMAN: They were worse off now than in war time.

The TOWN CLERK: The legal defence has been raised that there is an unavoidable cause; but the witness has said that even if he acquired the quantity of coal required, he would not endeavour to work-up to the conditions laid down by the Act of Parliament.

Mr. TROUGHTON: Supposing Mr. Davis told the Directors that he was going to ignore the Act of Parliament, I think they would probably have something to say about it.

The CHAIRMAN said they had decided to convict. The penalty would be £5, and the testing fee £2 2s.

A Successful Rating Appeal.

The Whitstable Gas and Coke Company, Ltd., recently appealed against their assessment, which stood at £1200 net rateable value. The Company were represented by Mr. E. Howard Collins and Mr. R. B. Reeves (the Secretary and Manager). Mr. Collins explained that the Company were very reluctant to come before the Assessment Committee, as he understood fully the difficulties the Committee had to contend with at the present time; but the position of gas companies had been made so difficult during the war that the Company considered it their duty, not only to the shareholders, but more especially to their consumers, to ask for an adjustment. Figures were produced of the earning capacity of the Company to a hypothetical tenant; and it was shown that, after deducting the usual percentage on tenant's capital, the resultant figure was a minus quantity. The Assessment Committee agreed to reduce the net rateable value to £1000; but the Company were unable to accept this decision, and stated their intention of appealing to Quarter Sessions. The Committee thereupon reconsidered the matter, and agreed to reduce the net rateable value from £1200 to £600.

Birmingham Gas Undertaking.

The Birmingham City Council, at their meeting on Tuesday last, approved practically without discussion the recommendation of the Gas Department in favour of an all-round advance of 6d. per 1000 c.ft. as from the June reading of meters. Alderman Lloyd, the Chairman of the Committee, stated that if their fears were justified by the experience of the next few months, it would be necessary to come again to the Council for sanction for a further increase in price. They had not by the present advance provided against any possible increase in wages to gas workers, from whom an application had been received for a 10s. week advance. Regarding the recent advance of 4s. 2d. in the price of coal per ton, this meant an additional annual charge on the department of £165,000. An extra 1d. per 1000 c.ft. yielded £40,000; so that at least 4d. was needed to meet this charge alone. It was anticipated that the increased rates and taxes would amount to £80,000 more than last year, and there were other additional charges. Speaking with regard to possible works' extensions, Alderman Lloyd reminded the Council that a site for a new gas-works was acquired at Washwood Heath eight years ago. Gas consumption showed an upward tendency, and was rapidly approaching the record figures of the war period. It was likely that the preliminary steps for the new works would have to be taken shortly. As to the accounts, instead of taking £23,012 from the reserve fund, as was done last year, £21,329 of the amount had been placed back; so that the accounts were £44,341 better, after paying £7857 more for bank interest. The statistics of the Department were: Capital expenditure to the end of the financial year, £2,993,028; coal carbonized last year, 774,228 tons; gas oil used, 2,545,528 gallons; gas sold and used on works, 11,329,113,800 c.ft.; gas rental, £1,898,700; average net price of gas, 3s. 4·22d.; residuals sold—coke and breeze £693,826, tar £97,057, ammoniacal liquor £104,737, allowance to authorities on public lighting accounts £9311—surplus profit *nil*. The annual report was approved.

The new price of gas in Blackpool is to be 4½d. per 100 c.ft., from the beginning of the September quarter.

MISCELLANEOUS NEWS.

SULPHATE OF AMMONIA FEDERATION.

Further particulars are now available as to the constitution and object of the Sulphate of Ammonia Federation, the registration of which was lately announced in our pages as "a company limited by guarantee."

The objects are: To act as agents for, to deal in, import, export, and dispose of, provide storage accommodation for, store, promote for use at home and abroad (by advertisement or other methods of propaganda), and keep in touch with the progress made in the knowledge and practice of making sulphate of ammonia; to supervise and finance research undertaken in the interest of the production and use thereof. The Federation being a non-profit association, the funds and property are to be applied solely towards promoting its objects. The management is vested in a Council, the first members of which include seventeen gentlemen well known in the gas industry. A member of the Council must be a British subject, and either:

(1) A producer in the preceding year of at least 10,000 tons of sulphate of ammonia; or (2) a representative of a company, firm, or public corporation, or group of companies, firms, or public corporations, whose aggregate production in the preceding year amounts to at least 10,000 tons of sulphate of ammonia; or (3) a representative of a group of companies, firms, or corporations in one of the districts mentioned below, or using one of the methods named below, who would be excluded from membership by reason of their aggregate production in the preceding year being less than 10,000 tons.

Each of the following districts will be separately represented on the Council, and entitled to one representative for each complete 10,000 tons of sulphate of ammonia produced in the district in the preceding year by members and public corporations carrying on business therein: (1) Scotland; (2) Northumberland, Durham, and the North Riding of Yorkshire; (3) Cumberland, Westmoreland, and the Isle of Man; (4) Lancashire, Cheshire, North Wales, and Ireland; (5) Yorkshire (except North Riding), Lincolnshire, Derbyshire, Leicestershire, Northamptonshire, Nottinghamshire, and Rutlandshire; (6) Staffordshire, Shropshire, Warwickshire, Worcestershire, Herefordshire, and Gloucestershire; (7) South Wales and Monmouthshire; (8) the counties lying to the south of a line drawn from the Wash to Bristol, other than those specified above. The different methods of production (whether by means of coke-ovens, gas-works, iron-works, Mond process, shale works, or otherwise) shall, as far as practicable, be separately represented on the Council.

The constitution of the Council corresponds to that of a Council representing an annual production not exceeding 360,000 tons of sulphate of ammonia. In the event of the annual production of the members of the Federation, or public corporation which shall have entered into an agreement with the Federation, increasing beyond 360,000 tons a proportionate increase shall be made in the quota of 10,000 tons as qualifying for membership of the Council; the quota being increased in respect of each 50,000 tons per annum further production, but so as to limit to a maximum the number of members serving on the Council.

PRIMITIVA GAS COMPANY OF BUENOS AIRES, LTD.

A Melancholy Report, but the Chairman Optimistic.

The Annual General Meeting was held last Tuesday, at River Plate House, Finsbury Circus, E.C.—Mr. A. E. BOWEN in the chair.

The SECRETARY (Mr. J. M. Macmorran) read the notice convening the meeting; and the Directors' report and the accounts were taken as read.

The CHAIRMAN, in moving their adoption, said the report was a very melancholy one; but the shareholders would observe that it was in accordance with what he foreshadowed when he had the pleasure of meeting them on March 23 last. As he then went very fully and carefully into the position of the Company, it would not be necessary for him on this occasion to take up a great deal of time. Since the meeting in March, the Directors had been very much occupied in trying to find some solution of the difficulties as regards working capital, and the reduction of the amount of £367,000, now standing to the debit of profit and loss. But they had decided, after mature consideration, that they had better not touch the capital account for the present at any rate, and until they saw how the new contract worked out. The new tariff came into force on Feb. 1 last; and for the month of February a profit was made of about £4350. But this was principally owing to the chemical works showing a profit of £6000 during the month. This profit was not maintained during March and April, because some American coal, which was the only stuff they were able to obtain, gave very bad results—a poor yield of gas, low calories, and only 45 p.ct. of inferior saleable coke. This obliged them to increase the manufacture of water gas, in order to obtain the calories which, under the new contract, the Company were obliged to supply. The total loss for the first four months of the year was £10,805, against £17,890 for the corresponding period of last year; but the shareholders would remember that the Company worked under the old tariff in January. The exact figures of the chemical works' profits, as far as the Board had them, were: February, £6000; March, £1800; and April, £5000. But in April some better coal was obtained from America, which had produced excellent gas and residuals; and they had been able to close-down the water-gas plant for the present. Their people in Buenos Aires were confident that they would obtain much better results, provided they could secure coal of fair quality. A further trouble was that there was no coal suitable for gas making to be obtained from England; and the Company were, therefore, dependent entirely upon supplies from the United States. In that country

the position was at present critical, owing to the partial breakdown of the railroads and labour troubles; and gas coal, which was formerly sold at $4 per ton, and which, until after the armistice, did not realize more than $6 a ton, was now worth about $14 f.o.b., and supplies were very hard to get. Of course, the Company had a sliding-scale under the new contract, which permitted them to raise the selling price of gas in accordance with the price paid for coals. But the Directors were afraid of completely ruining the industry if they put the price too high, as the great desideratum was to build-up the output of gas by obtaining new customers. As he explained at the meeting in March, the Company had not only lost their money, but they had lost the best part of the business; and it would take some time to work it up again. He was glad to tell the shareholders that the latest reports they had from the other side were to the effect that the consumers were increasing rapidly, owing to the better quality gas the Company were able to give them. They were in no difficulty about the collections. Argentina was very prosperous, as it produced the cereals and meat which devastated Europe badly needed. Buenos Aires did most of the business of the country; so he hoped, and thought, the Company would gradually be able to work-up the price of gas to compensate for the present enormous cost of fuel. The great trouble, of course, was the lack of working capital, which was all lost. The shareholders would see by the balance-sheet that on Dec. 31 last there was owing to the bankers in Buenos Aires £51,254, against which they held bills receivable for £16,912, and municipal certificates for £35,995. A cargo of coal from the United States—say 6000 tons—cost about £45,000. The Directors had to borrow the money from the bankers, either here or in Buenos Aires—of course, at a high rate of interest. But it was to be hoped they would make sufficient profits in the next few months to repay the loans, and have sufficient money for current needs. The cost of living in Buenos Aires had, of course, increased in proportion with other things; and a series of labour troubles commenced in June last. But as the Company were unable to grant any increase in wages or salaries until a new or modified contract was obtained, they were compelled to face a general strike, which took place on June 11, when all workmen on both the works and outside departments stopped. The demands of the workmen left the Company no option but to fight; and it was not until after some twenty days that matters were brought to a successful issue, and work again became normal. The strike, however, lost the Company a large number of consumers, chiefly for industrial purposes; and it would take some considerable work to re-establish the business. As already stated, the strike at that time was unavoidable. The Company had not the money, and could not pay the increase demanded. They had had no labour troubles to speak of since he returned from Buenos Aires, when an arrangement was made that, when the new tariff was obtained, the Company would raise the workmen's wages to the municipal scale. This had now been done; and at present the men were working well and cheerfully. He did not know whether it was worth while troubling the shareholders with a lot of comparisons in connection with the accounts. The statement that the Company lost on the year £238,000, and that they had to get rid of the debit balance of £367,000 must be pretty well sufficient for anybody with an appetite for figures. He should like, however, to explain one or two items—such as the loss on municipal accounts in Buenos Aires, £66,000. This was the sum lost owing to the fines imposed upon them, which, it would be remembered, he was able to compromise for about half the original amount. They had no fines to bear now, as the Company had no municipal or public lighting now, excepting a few hospitals and other institutions. The Company had to pay the costs of the arbitration of 1918 in Buenos Aires, £9653. The next item was the loss on the sale of properties, £45,725. When he was in Buenos Aires last year, he found (as explained at the meeting in March) that the credit of the Company was so bad that he personally had to guarantee their bankers before they would lend the money required to meet the debenture interest. They had several properties—such as the old River Plate Gas Company's office in the Calle Corrientes, and a piece of land in the Calle Cordoba—which were bringing in little or nothing. The last-named property was a piece of unoccupied land, upon which they had to pay municipal taxes. The offices in Calle Corrientes brought in a rental of about 3 p.ct. per annum, while they were paying 7 and 8 p.ct. to the bankers for money. He, therefore, found it was absolutely necessary, if they were to carry-on, to sell these two properties by auction. The Cordoba one gave a small profit of £2465; the Corrientes left a loss of £48,190, both, of course, in comparison with the figures at which they stood in the books; and the loss had to be written-off. He had referred to these three items in the accounts, because they were non-recurrent. They had swollen the year's loss by £120,000; but it would be seen they had no connection with the working of the business, but were incidental losses. The shareholders might like to know that the average price paid per ton of coal decreased from £7 10s. 6d. in 1918 to £5 14s. 5d. in 1919; but this was not much in their favour, as they could not obtain any considerable quantity of coal—only 12,000 tons altogether. They required at least 5000 tons a month, and even then they had to burn a lot of wood and other materials. The bad debts written-off decreased during the past year to 2·21 p.ct. of the collections, which was the lowest on record. The chemical factory results showed a serious decrease from £128,606 in 1918 to £64,382 in 1919, owing entirely to their being unable to obtain raw materials. When he was in Buenos Aires last year, he found that they had large orders for sheep-dip and other things, which they were totally unable to fulfil. The basis, of course, of the chemical works was the tar they made at the gas-works, and having carbonized very little coal during the year, they had little or no tar to deal with. He would just like to say that they had had a letter from one of their most esteemed shareholders, suggesting that the Directors should write-off from the ordinary share capital the loss of £367,000, and the Retiro amortization account of £644,000, with the object (as he said) of being able to pay the preference dividend, after which the reduced ordinary shares would be none the worse off, as they would get the balance of earnings. The Board saw no object whatever in doing this, because the preference shareholders could only get their arrears of dividends out of earnings; and it did not look at present as though there would be anything for them for some time. As he said before, the Directors thought it advisable not to touch the capital account at present; and he assured the shareholders they had given most earnest consideration to the matter. He was very glad to see with them that day their General Manager (Mr. William Angus), who was in England on a short holiday, after his most strenuous times in Buenos Aires. He (the Chairman) could personally testify to the enormons amount of work and the great ability he showed in helping him to arrange their outstanding matters with the Municipality. He (the Chairman) could not possibly have done anything at all without him; and he was sure they would like this opportunity of giving him grateful thanks for his services to the Company. He never lost hope of a successful issue to the negotiations; and it required a born optimist to take this view while they sat, hour after hour, with the Municipal councillors at an apparent deadlock. He hoped that Mr. Angus would return to Buenos Aires in August very much better for his rest and change, and in good fighting trim. He (the Chairman) explained to the shareholders in March how much they were also indebted to the Chairman of their Local Committee (Don Samuel Pearson) and to Mr. Lockwood for the assistance they gave Mr. Angus and himself in coming to the arrangement with the Municipality. The following was the latest cable information that the Board had from Buenos Aires: "Loss during March £3200; during April £4700, due to inferior coal used. Profit during February due to chemical works £6000, which was not maintained during the next month. Consider future results of Company cannot be estimated on the basis of first three months new contract. Now using Ethelogan gas coal; result is very satisfactory. In order to take advantage of a very brisk demand for coke, which we can get a high price for, must make every effort to obtain adequate supplies of good bituminous coal. A great scarcity of general fuel exists here. Gas consumers continue to increase. Have no difficulty in the collection of the new tariff. Present prospects indicate considerable improvement." He (the Chairman) was much disappointed with the results of the first three months' working under the new agreement. This was owing to the bad coal; and they had to take what they could get, in order to keep the works going.

Mr. H. E. JONES, in seconding the motion, referred to the account as a somewhat gloomy one. But the explanation of it was extremely simple. The war prevented the Company getting coal carried to Buenos Aires at any price. The Chairman had referred to their indefatigable and skilful Manager, Mr. Angus; and, as an old gas manager, he (Mr. Jones) could sympathize with him. He had had to make gas from sawdust and wood; and in his desperate straits, he had even had to invade the territory of poor animals, and rob them of food material. On top of this, they had a Municipality who had exhausted every possible resource in defeating the proper payment to the Company of the money for the gas they had burned, and in inflicting upon the Company monstrously unjust and improper fines, because they could not get coal which it was physically impossible to obtain. This had gone on month after month and year after year until they had reduced the Directors to putting before the shareholders a report such as they were now discussing. The worst feature of it was that all the capital for working purposes was exhausted; and more capital was wanted than in ordinary times, because everything was so dear that all stocks and stores were magnified in cost by four or five times. In the circumstances they had to present the figures which the Chairman had described with such frankness and candour that he (Mr. Jones) was sure he carried all the shareholders with him. To their Chairman they owed a great deal; for until he went out to Buenos Aires, and in his usual energetic and skilful manner worked things out to a solution for the Company, they were not getting better, but daily worse, in spite of the great efforts of Mr. Angus and their local representatives. He hoped this meeting and future meetings would fully recognize the eminent services of their worthy Chairman. There was no need for them to reduce the capital value of the undertaking. The works and distributing plant could not be constructed to-day under four or five times the amount at which they stood in the Company's books. They had a fine plant, and a monopoly of gas supply in one of the finest cities in South America. This made him feel that, though the Directors were not able that day to offer any dividend, but only explanations of the serious loss thrust upon them, there must be a profit in the future conduct of their undertaking in that fine city. He also contrasted the treatment meted-out to the Company with the considerate treatment a Company [the European] of which he was the Chairman had met with from the authorities and the people of France.

There was some discussion—the principal speaker being Mr. E. C. Humphreys, who appeared to have found in the new contract ways and means by which the Municipality could expropriate the Company at some time or other without compensation. But the Chairman's reply to his long speech showed that he was altogether wrong in his construction of the new contract. The Municipality, the Chairman said, had no right to take the undertaking over at any time. The concession was in perpetuity. The new arrangements that would have to be made at the end of twenty years only referred to the price of gas. The only amortization the Company had to provide for was in respect of the Retiro works, which the Municipality forced them to give up, as the site was wanted for the building of the Central Argentine Railway Station. The two successive contracts which were made with the Municipality in past years, and which did not provide for an increase in the price of gas under exceptional circumstances, were bad, and were an important cause of their troubles. They could then get coal out to Buenos Aires for 25s. a ton, as against £8 and £9 during the war. His friend, Mr. Jones, had spoken about the "infamous" conduct of the Municipality. He (the Chairman) did not agree with him. The municipal authorities had a right to protect their people as much as they could; and they would have been "fired-out" had they not done so. When he went to Buenos Aires, had he not arrived at a *modus vivendi*, the Company would not have been in existence to-day; they would have been bankrupt. Answering a further question, the Chairman stated that the Company were entitled to 8 p.ct. upon the aggregate of their capital—debenture, preference, and ordinary all included—before making a reduction in the price of gas. If they could earn 8 p.ct. on the whole of the capital employed, it might mean that

they would be able to pay 12 p.ct. on the ordinary shares. But he did not think they need trouble about that yet. Personally, however, he was more hopeful of the future of the Company than he had been for years. Another shareholder asked whether the Board had considered the possibility of receiving compensation through the Government from the money to be obtained from Germany, seeing that their losses had arisen as the result of the war. The Chairman answered that it had not occurred to him that they had a claim against the Government; but he would consult their legal adviser. As to a further question, he said the preference dividend arrears would have to be cleared off before the ordinary shareholders could get a penny.

The motion was unanimously carried.

The retiring Directors (Messrs. A. E. Bowen and Ross Pinsent) and the Auditors were re-elected; and, in the votes of thanks that were subsequently passed, great appreciation was shown of the special services of the Chairman, the local representatives, and Mr. Angus.

BAHIA BLANCA GAS COMPANY, LTD.

The thirteenth ordinary general meeting of the Company (which was held last Wednesday at the London Offices, No. 1, East India Avenue, Leadenhall Street, E.C.) was presided over by Mr. J. M. MACMORRAN, who was elected Chairman of the Company towards the end of last year.

In moving the adoption of the report, a notice of which has already appeared in the "JOURNAL" [*ante*, p. 501], he said that, from the revenue account, the shareholders would see that the loss for the year amounted to £9841. As compared with 1918, there was a small decrease in the receipts from the sale of gas, and a very much larger decrease under the heading of sales of residuals—the latter owing to the lack of bye-products from the gas-making materials they had been forced to use. These two items alone accounted for some £4560, which, with the difference under the heading of sundry receipts, made the total receipts less by £4637. On the other side, expenditure was down £2568, so that on balance the loss was increased by £2069 as compared with the previous year. The item "participating debenture stock" appeared in the balance-sheet for the first time this year. When the shareholders were last called together, shortly after the participating debenture stock was issued, it was generally anticipated that the position showed signs of becoming more normal; but subsequent events had proved this idea to be erroneous. The succession of strikes in this country, the unsettled state of the fuel markets of the world, and the permanently higher cost of labour and materials, &c., had prevented the settling-down to which they had all looked forward. As a result, the Directors went very carefully into the Company's position, in conjunction with their Manager in Bahia Blanca, and came to the conclusion that in all probability two or three years would be required to enable the Company to recover from the after-effects of the war, and to pay its way. In these circumstances, and only after very careful consideration, it was decided to call a meeting of the participating debenture stockholders, and to put the matter clearly before them—to point out that the small amount of working capital available was absolutely necessary to carry on the business, that the payment of debenture interest would rapidly absorb the small cash balance available, and that it would be to everybody's advantage if they would consent to forego their interest for a term of three years from Jan. 1 last. The trustees for the debenture stockholders concurred with this proposal. The stockholders supported the suggestion wholeheartedly (proof of this being afforded by the fact that proxies were forthcoming to the extent of 98 p.ct. of the total issue); and the resolution waiving interest was duly passed.

After a careful study of the general situation, it appeared to the Directors that the present high prices must be considered permanent; and this being so, the existing position was an impossible one. The Directors had therefore instructed the Manager (Mr. A. M. Hunter) to proceed with negotiations for altering the "permiso" or permission under which the Company were working, with a view to obtaining the necessary authority to charge an increased price for gas. The Company had been charging the maximum price for some time now; and a perusal of the accounts was sufficient proof that, with fuel, materials, &c., as costly and scarce as they were to-day, the price was not a paying one. This question had always been before the Board; but had negotiations been commenced before, the authorities, in common with everybody else, might have thought the Company were trying to take advantage of temporary conditions which would right themselves in due course. The Directors realized that the present high prices must be considered normal; and they had every hope that Mr. Hunter would be able to convince the municipal authorities of this fact—especially as they had the precedent of the Primitiva Gas Company of Buenos Aires to go upon. In any case, with or without precedent, there could be no possible doubt that the request was fair and reasonable. The Manager had put forward a sliding-scale based on the net cost of combustibles—*i.e.*, after allowing for the sale of bye-products—a very wise provision, seeing that their coke and tar market was not a good one. This would enable them to increase their charges *pro ratâ* with fuel costs. At the same time they proposed to increase the calorific value of the gas supplied. Although they had always given consumers satisfaction, the necessities of the past few years had compelled them to lower the calorific value.

A prophecy as to future prospects he was not prepared to give, seeing that the proposed changes would be very far-reaching, and results would depend to a large extent on circumstances over which the Board had no control. Bahia Blanca had had a good year, so far as crops were concerned; and with the port itself in a prosperous state, there was every hope that the increased prices, while not materially affecting the consumption, would be the means of turning the scale so far as the revenue account was concerned. With regard to the general working, fuel had again been scarce and dear; and, of course, there had been labour trouble. With regard to fuel, the oil-borings at Plaza Huincul had been giving increased yields; and if they could draw their supplies from this source, it was anticipated that, after paying all charges, the oil would be cheaper than from other sources. In response to a request for the latest information from Bahia Blanca, they had been informed that it was fully expected to receive Huincul oil about the middle of June. The Company's prospects were more favourable. As they would no doubt have gathered, the Board had a very high opinion of the abilities of Mr. Hunter; and during 1919 he voluntarily postponed his extremely well-earned European leave, owing to the impossibility of finding an efficient *locum tenens*. This was a matter of great regret to the Board, because they realized the strain and anxiety undergone by Mr. Hunter during recent years. This fact, together with the extraordinarily good fight he had put-up against adverse circumstances, was in itself sufficient to show what a valuable servant Mr. Hunter was. He (the Chairman) would like to place on record the whole-hearted appreciation of the hard work and the self-sacrificing efforts of the Manager in Bahia Blanca. They had also been extremely well served by the staff in London.

The report was adopted.

In proposing the re-election of Mr. A. M. im Thurn, the Chairman mentioned that since the last general meeting of the Company Mr. F. C. im Thurn had resigned his seat on the Board; and he thanked him for the very valuable services he had rendered in the past.

NOTTINGHAM GAS UNDERTAKING.

A Year's Profit of £117,513.

Highly remunerative results are again recorded in connection with the Nottingham Corporation gas undertaking. The total income on revenue account for the past year amounted to £630,946, and the expenditure to £513,432, leaving a balace of £117,514 to be carried to the profit and loss account, to which is to be added £30,228 brought forward from last year, and £7150 bankers' interest, interest on war stock, &c., making a total of £154,892. After deducting interest on capital, the contributions to the sinking fund, and placing £3500 to depreciation of stores, there remains a balance of £92,216 at the disposal of the Council. The Committee have already arranged for £30,000 to be handed over to the Finance Committee in aid of the general district rate; and they recommended that the balance be disposed of by applying £30,000 to the renewals fund and carrying forward £32,216.

The quantity of gas sold during the year was 2,263,951,400 c.ft., against 2,059,370,900 c.ft. the previous year, being an increase of 204,580,500 c.ft., and an increase of 12,648,700 c.ft. as compared with the year ended March 31, 1914. It is therefore apparent, observe the Committee, that the conditions regarding gas supply are now much more normal than during the previous year. The amount of gas sold per ton of coal carbonized was 13,251 c.ft., against 12,292 c.ft. The gas sold for public lighting was 37,525,200 c.ft., as compared with 13,083,800 c.ft. for the previous year, and 102,143,500 c.ft. for the year ended March, 1914.

An adjustment in the charges for gas came into operation as from the date of the reading of the meters for the Michaelmas Quarter, 1919. Further advances of war wages and bonuses have been granted to the staff and workmen since the issue of the last report. These concessions represent a very substantial amount; and their full effect is not shown in the accounts now submitted. Considerable difficulty was again experienced in keeping-up the gas supply during the winter months, in consequence of shortage of coal and gas oil; and it was necessary for the Controller of Coal Mines to allocate to the department substantial quantities of Durham coal to tide-over the difficulty. The charges for meter renewals and repairs during the year have been heavy; but these are due to causes well known in the gas industry. The position as regards supplies of meters during the war and for some time afterwards was critical, with the result that the Committee were unable adequately to keep meters in an efficient state of repair; while at the same time meters condemned by the repairers as unfit for further use could not be replaced. The conditions have now become almost normal; but the prices of materials and wages have enormously increased over pre-war times.

The Committee desire to place on record their appreciation of the valuable services rendered to the department by Mr. William Garton, who recently resigned his position as Gas Accountant. He had been connected with the undertaking for no less a period than 63 years and was a most highly respected official.

MR. JOHN WILKINSON'S REPORT.

The ninth report of the Engineer and General Manager (Mr. John Wilkinson), which is attached to the Committee's report, states that during the period under review, 158,846 tons of coal and 132,446 gallons of oil were utilized in manufacturing 2,232,101,000 c.ft. of coal gas, 83,146,000 c.ft. of water gas—total, 2,315,247,000 c.ft. In addition, 85,586,000 c.ft. were purchased from the Ministry of Munitions; this gas being available for sale as the result of carbonizing cannel coal for the production of fuel oil at the Radford works. The total quantity of gas available for consumers was thus 2,400,833,000 c.ft. The total sale of gas during the year amounted to 2,263,951,400 c.ft., an increase of 204,580,500 c.ft., or 9·93 p.ct., when compared with the figures (2,059,370,900 c.ft.) for the previous year. The comparative receipts for gas sold are: 1920, £444,765; 1919, £328,398; increase, £116,367. The gas unaccounted-for during the year was 5·70 p.ct., as compared with 6·71 p.ct. for the previous year. The sale of gas per ton of coal carbonized was 13,251 c.ft., as compared with 12,292 c.ft. for the previous year. The number of meters fixed to March 31 (including 469 lamp meters) was 85,109, being an increase of 894 on the previous year. Mr. Wilkinson adds that the position with regard to supplies of new dry meters and the repair of dry meters has improved considerably during the last few months; but the position with reference to new wet meters and repair of wet meters is no better. It has therefore been found necessary to fix a very much larger proportion of dry meters than has formerly been the case in Nottingham; and by this means considerable progress has been made in dealing with the arrears of meter work.

The following are the comparative expenditures for coal and receipts for residuals during the last three years:

	Expenditure for Coal.		Receipts for Residuals.
1920 . . .	£214,648	..	£165,393
1919 . . .	158,882	..	117,403
1918 . . .	167,135	..	125,077

Mr. Wilkinson, in conclusion, observes: The markets and general conditions controlling the gas industry are very unstable. Expenses continue to increase very considerably; and it is by no means certain that the charges for gas have reached their maximum. Probably a good deal will depend upon the final terms of the General Bill now before Parliament, and the extent to which the Committee will be inclined to take advantage of the provisions of the Bill with regard to the calorific power of the gas supplied.

EVESHAM GAS-WORKS ACCOUNTS.

The Gas Committee reported, at a recent meeting of the Evesham Town Council, that a special meeting had considered a letter from the Manager and Engineer (Mr. Percy H. Fletcher) reference to his salary; and they had recommended that the Council grant him an increase as Manager from £350 to £450 per annum, and pay him £60 a year as Gas Engineer—house allowance and war bonus to remain as at present. This arrangement was to commence from Jan. 1 last.

The Town Clerk intimated that the balance-sheet showed a loss on the past year's working of £236. Alderman Fisher, in moving the adoption of the report, stated that the revenue account revealed an expenditure of £20,282, and receipts to the amount of £20,046, which left a debit balance of £236. This, he said, was a considerable improvement upon last year. The chief item of expenditure was for coal, which amounted to £10,430. Fortunately, the market for residuals had been good—the returns from these amounting to £6439. Receipts for sales of gas were £12,247, against £8706; this being chiefly due to the higher charges. It was difficult to compare one year with another at the present time, owing to alterations in prices, and to the fact that the consumers were rationed for a portion of the year. Control having been removed, he expected the demand to increase. When they took into consideration the high cost of raw materials, he thought the year's working was very satisfactory—really better than might have been expected. Mr. Field seconded the adoption of the report, and congratulated the Committee, the Manager, and the workpeople on the balance-sheet, which he thought was satisfactory. He hoped next year they would have a balance in hand of £1000 or more.

Mr. Knight-Coutts, in seconding the resolution to increase the Manager's salary, observed that there was always a great deal of criticism when the salaries of public officials were increased. For years Mr. Fletcher had worked with all his heart, on a minimum salary; and they were not now treating him on the same basis as the workpeople, or his salary would be a great deal larger. Mr. Gill Smith, supporting, said that the increase would not be paid by the ratepayers, but by the consumers.

The report and resolution were adopted.

LIVERPOOL LIGHTING ENGINEER'S REPORT.

In his report on the work of his department for the year 1919, Mr. A. G. Smith, the Liverpool City Lighting Engineer, says that, prior to 1908 all the lamps were dealt with by the torch system; but in that year the Committee experimented with a clockwork controller which automatically lighted and extinguished each lamp. This experiment proving satisfactory, it was decided to adopt the system throughout the city. For the purpose of maintaining the necessary bye-pass, a storm-proof lamp was essential; and the one designed by the engineer has given entire satisfaction. It is estimated that approximately 95 lamp attendants will be required to operate this system throughout the city, as against 190 under the old arrangement. The work of revising the old system of lighting was commenced in 1909; and up to the outbreak of the war in 1914, 13,060 controllers had been fixed, operated by 68 lamp attendants. It is hoped that during this year the work of installing these controllers will be resumed. In addition to the lamp attendants, there are 63 lamplighters, who are lighting, &c., the lamps under the old system; and these now deal with an average of 106 lamps each. At the beginning of the year, only 7522 gas-lamps were lighted, which was increased to 9589 by March 31. On May 1, this was reduced to 3002 for the summer period; but early in August, owing to the police strike, the number lighted was again increased to 9614, which has been added to daily, until at the close of the year 11,106 lamps were lighted, out of a total of 19,974. The total length of roads equipped for lighting at the end of the year, irrespective of courts and passages, amounted to 502¾ miles—8¾ miles being by electricity, 486¼ miles by incandescent gas, 3¼ miles (principally back streets) by flat-flame burners, and 4¼ miles by oil—in Woolton.

Under the Sales of Gas Act, 1859, inspectors are appointed for the purpose of testing gas-meters under a form prescribed in the Act. Liverpool is one of the many stations situated throughout the United Kingdom; and the Inspector is appointed by the Corporation. The testing fees were fixed by Statute in 1859. They are obviously too low to cover the present cost of carrying-out the work; and considerable loss is entailed each year in almost every station. From time to time efforts have been made to adjust these charges, without success; but in August last, the Committee decided that a representation should be made to the Board of Trade in favour of such amendment of the Act as would permit of an increase in the charges. At the present time, an effort is being made by the Association of Statutory Inspectors of Gas-Meters in the same direction; and it is hoped that these will be successful. The number of meters tested during 1919 was 13,049, the

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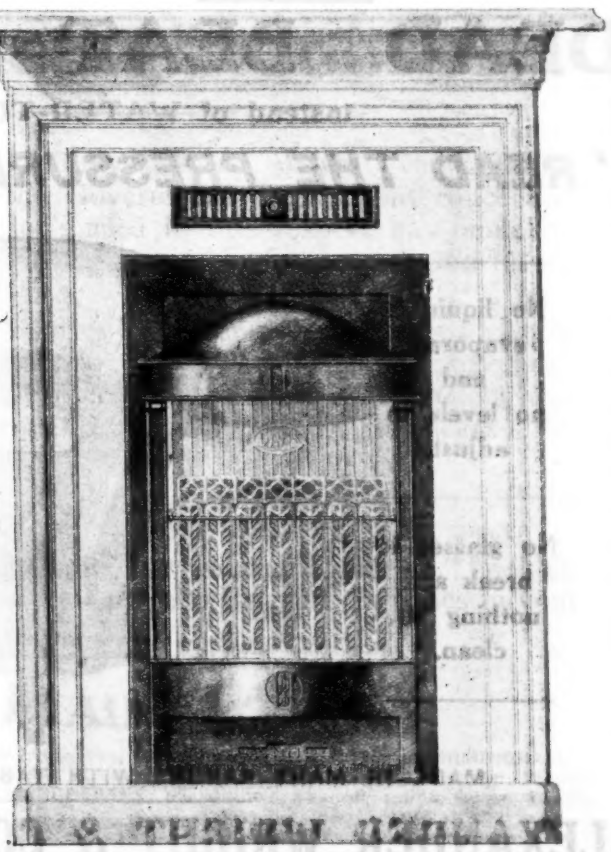

fees for which amounted to £425. The details were: Dry meters—approved, 1249; rejected, 357. Wet meters—approved, 4209; rejected, 128. Prepayment meters—approved, 6788; rejected 318.

During 1914, the Liverpool Gas Company obtained new statutory powers, under which tests are made for calorific and illuminating power and pressure, and to ascertain the presence of sulphuretted hydrogen; the results of the tests being forwarded daily to the Company. The standard calorific power was fixed at 550 B.Th.U. gross, with a margin of 5 p.ct., beyond which penalties are enforceable. No standard has been prescribed for illuminating power; and tests by the flat-flame burner are to be taken for record purposes only. In addition to the above statutory tests, a Beasley patent recording calorimeter is installed in the Engineer's Department, which records the calorific power of the gas at each hour of the day and night. The pressure at which the gas is to be supplied is prescribed in the Act.

All tests are made at the Company's stations, with apparatus provided and maintained by the Company and approved by the Corporation. For this purpose periodical visits are made to Linacre, Athol Street, Eccles Street, Caryl Street, Wavertree, and Garston. The following are the average results of tests for calorific power made at each testing-station during the year, involving 969 visits:

Station.	B.Th.U. per Cubic Foot of Gas, Gross.	Illuminating Power Candles. Flat Flame.
Wavertree	503·37	3·65
Caryl Street	480·72	5·16
Eccles Street	473·25	4·22
Athol Street	471·93	3·48
Linacre	473·47	3·47
Garston	481·08	3·64
Average	480·63	3·93

These figures are not in compliance with the standards; but it must be remembered that they include the period during which the Board of Trade, by a Gas and Coal Emergency Order, prohibited the use of a greater amount of coal by gas undertakings than would suffice to produce gas of a calorific power not exceeding 425 B.Th.U. gross.

From the amount of carbonic oxide found, it is estimated that the average quantity of carburetted water gas in the gas supply was as high as 43·4 p.ct. A diagram shows the average maximum and minimum calorific power of the gas at each station during each of the twelve months of the year.

Testing gas pipes and fittings was instituted in 1907, as it was considered desirable that a test for ascertaining the soundness or otherwise of gas pipes and fittings in consumers' establishments should be available, owing to the supply of carburetted water gas in the city. The test is undertaken at a nominal fee of 2s. 6d. per meter, and for a time it proved useful; but lately few applications have been received.

GERMAN SULPHATE OF AMMONIA ASSOCIATION.

The report of the German Sulphate of Ammonia Sales Association of Bochum, recently published, states (says the "Iron and Coal Trades Review") that the year 1919 did not bring about the desired relief in economic life. Notwithstanding the extensive new installations established during the war for the production of synthetic nitrogen, the output of nitrogen was less than expected, as it was impossible to utilize to the full extent the capacity of the plants owing to the scarcity of coal and other raw materials and the reduced labour efficiency. As a consequence, the output was constantly considerably less than the requirements. Apart from the uninterrupted rise in wages and the prices of raw materials, the difficulties experienced in obtaining the latter were such that it was quite impossible to erect new plants; while the improvement and upkeep of existing installations could only be accomplished with difficulty. In addition, the after-effects of the events in November, 1918, were rendered specially noticeable in the working conditions of the coking plants belonging to the members of the Association.

During October, 1918, the production of the associated works, converted into sulphate of ammonia, amounted to 32,000 tons, while the average monthly output in 1919 was only 18,000 tons. The sale of sulphate of ammonia was carried on by the Association under Government regulations until the beginning of August, when it was transferred to the Nitrogen Syndicate of Berlin, to which the Association belongs. Despite higher prices, a number of the members of the Association incurred a loss, as a substantial portion of the increase had to be paid into an adjustment fund, and working expenses also rose with the advance in prices.

The propaganda work of the Association is to cease. An endeavour is, however, being made by large concerns who produce sulphate of ammonia in auxiliary plants to form a company to continue the propaganda within certain limits, so that sulphate of ammonia may retain its position as a fertilizer.

German Ammoniacal Liquor Plentiful.—A recent issue of the "Chemical Trade Journal" said: The German production of nitrogen is increasing, according to the latest reports; but there is difficulty in getting it shifted from the works. A statement issued by the German Ammonia Salts Union, of Bochum, points out that whereas in October, 1918, the Union produced about 32,000 tons, the monthly production in 1919 made only about 18,000 tons, and in April last only 7000 tons. Ammoniacal liquor must have been accumulating in large quantities since October, as the necessary sulphuric acid has not been available for conversion. These quantities of liquor have had to be stored at great cost, with a probable continuance of the trouble, as their manufacture into solid nitrogenous combinations has been impossible for want of the necessary store room, besides coal and lime.

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IMPROVEMENTS AT THE SHANGHAI GAS-WORKS.

From a copy just to hand of the "Journal of the Associated Chambers of Commerce in China and Hong Kong" for the month of April, some interesting particulars are gleaned as to the works of the Shanghai Gas Company, Ltd.—a British enterprise started some fifty-six years ago, with offices in London.

The first records of the Company date back to 1866; and these show that in that year the consumption of gas amounted to 5,318,000 c.ft. The history of the growth of the Company and its plant, including that for the recovery of bye-products, reveals the different uses to which gas has been put in this far eastern city, and is a tribute to the promoters, directors, and shareholders, past and present, of a concern which has steadily expanded and extended its scope and utility.

Mr. H. King Hillier, one time Engineer-in-Chief of the Company, put the whole matter very concisely when, in a short article he wrote as far back as 1906, he said: "The uses to which gas is put have increased far beyond the hopes or imagination of the original investors." And the truth of his words is found in the comparison between the quantity of gas produced in 1866 and last year—5,318,000 c.ft., against 526,000,000 c.ft. Again: The original works were contained on quite a small piece of land; to-day they occupy an area of more than ten times the extent, with a large additional area used as a distributing and storage station.

"The works themselves are all that works should be," says our contemporary. "There is an absence of needless bustle, but a remarkable concentration of energy. Every inch of space has been utilized; the various departments are distinct and apart and all under English control; there is an absence of clanging steel following upon the labour of the retort men who under old-fashioned systems filled the retorts a shovelful at a time and perspiringly raked them out. Up-to-date machinery has eliminated such hard and fatiguing work; the retorts are fed and cleaned automatically; and the absence of crowds of men in the retort-houses supplies a surprising contrast to anyone who has seen the manufacture of gas under systems not so far advanced."

The Company manufacture two kinds of gas—coal gas and carburetted water gas. Both have separate plants. The coal from which the gas is made is usually Japanese. It arrives at the works (situated on the Soochow Creek) in lighters, and is thence transported by coolies to its place set apart. This presents the one scene in the whole concern which may be described as a hustling one; for the men are in a hurry to discharge their "concentrated sunbeams," to quote Sir Robert Ball, amidst a coal dust blackened atmosphere. The coal is then ready for the retort, and elevators and overhead hoppers are employed—the former to scoop-up the coal and transfer it to the hoppers, whence it is fed into the retorts by a travelling machine of the rotary type. All the machinery is driven by electricity generated from gas-engines and dynamos on the premises. There are 23 retort-benches, each containing nine retorts heated by regenerator furnaces. The discharging machinery is of the pusher type—the coke on being pushed out falling on to a specially provided stage, and then to the ground floor "where begrimed Chinese await its arrival and transfer it to its appointed place awaiting purchase."

"Immediately the retorts extract the gas from the coal, an unseen work commences. The gas is conveyed under vacuum to the condensers, tar extractors, and scrubbers, under the influence of which tar and ammonia are eliminated—the first stage in the twin-process of purifying and the manufacture of bye-products. The second stage is for the gas to be forced through the purifiers which contain oxide of iron, the influence of which upon the gas extracts the sulphuretted hydrogen. The gas is then ready for whatever use it may be put to. It is conveyed to the holders—'huge ungainly structures'—to await its final journey through the mains to the jet, the stove, or the gas-engine, of which there are many in the Settlement." The Company last year used about 24,000 tons of coal in the manufacture of their coal gas.

Carburetted water gas is manufactured in entirely separate plant, consisting of generator, carburettor, and superheater. The first of these is filled with coke, which is heated to a high temperature. When the correct degree of heat has been obtained steam at 90-lbs. pressure is blown through the bed of coke and the water gas is generated, and passed on to the carburettor, composed of heated checker-bricks. At this point, oil is forced under pressure into the brickwork and becomes gasified. The resultant gas finds its way to the superheater which is also filled with red-hot checker-bricks, and in this the two gases are what is technically termed "fixed"—that is, made into a permanent and marketable gas. All that is then required is to pass the gas through the scrubbers to eliminate the tar, and to the oxide purifiers to extract the sulphuretted hydrogen.

The carburetted water gas plant is said to have certain advantages over coal-gas plant in that gas can be manufactured at a few hours' notice, whereas in the coal gas plant the time required to get ready is about a week. Some 492,000 gallons of liquid fuel were used in the manufacture of this gas this last year.

The residuals produced from coal gas during its manufacture are: Coke, tar, and sulphate of ammonia. The coke is sold as soon as it is made; and a large part of the tar is distilled, with the result that desiccated tar and pitch can be made as required. The desiccated tar is largely used for the surfacing of roads. As a result of the distillation of tar, creosote oils are produced, which find a ready market in Shanghai.

In the manufacture of sulphate of ammonia separate plant is required by means of which the ammoniacal liquor is heated in primary and secondary stills, after which it is passed through a saturator containing sulphuric acid. The sulphate of ammonia is deposited on the bottom of the saturator, whence it is reclaimed, dried, and is then ready for the market.

This covers cursorily the very interesting processes of the manufac-

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HOUSES are building slowly yet surely, and the Government Department concerned with the nation's need in this respect has made its selection of cookers suitable for present and future schemes.

The Main "Surrey" Cooker on stand was an early choice, and this popular Stove has already been supplied in large numbers to those districts fortunate enough to have schemes certificated by Government.

The design, dimensions, finish, and price of the "Surrey" Cooker make it ideal in every respect.

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ture of gas and bye-products; but a few words are necessary to explain the use to which carburetted gas is put. This, on the completion of its manufacture, is mixed with coal gas, and the combined gases form the illuminnting, heating, and motive power all over the Settlement. The gas is dispatched throughout the town by means of low-pressure mains which at various points are reinforced by high-pressure mains. There is also a high-pressure lighting system by which many of the streets in Shanghai are lighted.

The Company also conduct a large business in cookers, stoves, &c.; and to cater to the ever-increasing demand, a large staff of artisans is employed—tinsmiths, carpenters, blacksmiths, &c.—all engaged in work which ultimately provides for the comfort of the housewife. Every meter is tested before leaving the works, every cooker, everything in fact is guaranteed before being placed in the hands of the user; while a well-appointed laboratory serves the purpose of periodically testing the products of the works and establishing their excellence.

In brief, the Shanghai Gas-Works are an up-to-date concern, in the capable hands of Mr. F. W. Potter, the Engineer-in-Chief, who is at present contemplating certain improvements which will lead to still higher efficiency.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *June* 14.

The market in tar products remains steady, but quiet. Pitch is firm at something over 160s. per ton for next season—business for this season being practically finished. Creosote is steady at 1s. 1d. to 1s. 2d. per gallon net at makers' works, in bulk, with fluid creosote and green oil slightly higher than this figure. Pyridine bases are stated to be worth about 20s. per gallon, and solvent naphtha about 3s. 6d. per gallon for 95/160 quality. Naphthalenes have risen considerably in value of late, owing to the American demand, and purified crystals are quoted at £45 to £50 per ton in casks, at makers' works.

There is not much to report in regard to sulphate of ammonia, as farmers are little interested at this time of the year.

Tar Products in the Provinces.

June 14.

The average values for gas-works products during the week were: Gas-works coal tar, 94s. to 99s. Pitch, East Coast, 160s. to 165s. per ton f.a.s.; West Coast—Manchester, 140s. to 145s.; Liverpool, 140s. to 145s.; Clyde, 145s. to 150s. nominal. Benzol 90 p.ct. North, 2s. 6d. to 2s. 7d.; crude 65 p.ct. at 120° C., 1s. 7¼d. to 1s. 8¼d. naked at makers' works; 50-90 p.ct. naked, North, 2s. 4d. to 2s. 6d. Toluol, naked, North, 2s. 6d. to 2s. 7d. nominal. Coal tar crude naphtha in bulk, North, 11¼d. to 1s. Solvent naphtha, naked, North, 3s. 1d. to 3s. 3d. Heavy naphtha, North, 3s. 4d. to 3s. 6d. Creosote, in bulk, North, liquid, 11¼d. to 1s.; salty, 10¾d. to 11¾d. Heavy oils, in bulk, North, 1s. to 1s. 0¼d. Carbolic acid, 60 p.ct., 4s. to 4s. 1d. Naphthalene, £35; salts, £9 to £9 10s., bags included. Anthracene, "A" quality, 9d. per minimum 40 p.ct.; "B" quality, nominal.

FROM A MARKET CORRESPONDENT.

Tar Products.

A very firm tone continues in markets generally; and, despite talk of slumps elsewhere, there is no sign of weakening. Crude tar is very firm; and the demand for pitch is well maintained. Forward business is being done at current rates; buyers being very eager even up to twelve months ahead. There are now many large orders for road repairing purposes—this work having in many instances been delayed until it can no longer be left. South Wales consumers are quite willing to pay up to £8 10s. per ton; and even this does not seem to be the end of the movement, as some people are now predicting an advance to £10. There are very large inquiries for the naphthalenes just at present; but the materials are scarce. Export licences are still in abeyance. Crudes are uncertain; and while lowest grades can be had at £10, better qualities range up to £22. Refined averages about £45. Creosote continues to maintain strength, partly on account of the high prices being paid for fuel oil from America. Cresylic acid is rather higher, but there is no change in the position of carbolic acids. Naphthas are steady, with a small advance in solvent. There is an impression that further improvement is likely in this material. Intermediate products show practically no change.

Latest quotations are as follows:

Benzol: 90% London 2s. 5d. to 2s. 7d., North 2s. 4d. to 2s. 6d.; 50-90% 2s. 3d. to 2s. 4d. London, 2s. 2d. to 2s. 3d. North; crude 60-65%. 1s. 6d. to 1s. 8d.; pure, 4s. per gallon naked.

Crude Tar: London, 87s. 6d. to 90s.; Midlands, 85s. to 87s. 6d.; North, 85s. to 90s. per ton *ex* works. Refined tar, 65s. per barrel (free) on rail.

Pitch: London, 165s. per ton; East Coast, 160s. to 165s. per ton; West Coast, 157s. 6d. to 165s., with Manchester 160s. per ton, and Glasgow 160s. per ton; South Wales, 170s. per ton.

Solvent Naphtha: London, 3s. 4d. Provinces average 3s. 2d. per gallon.

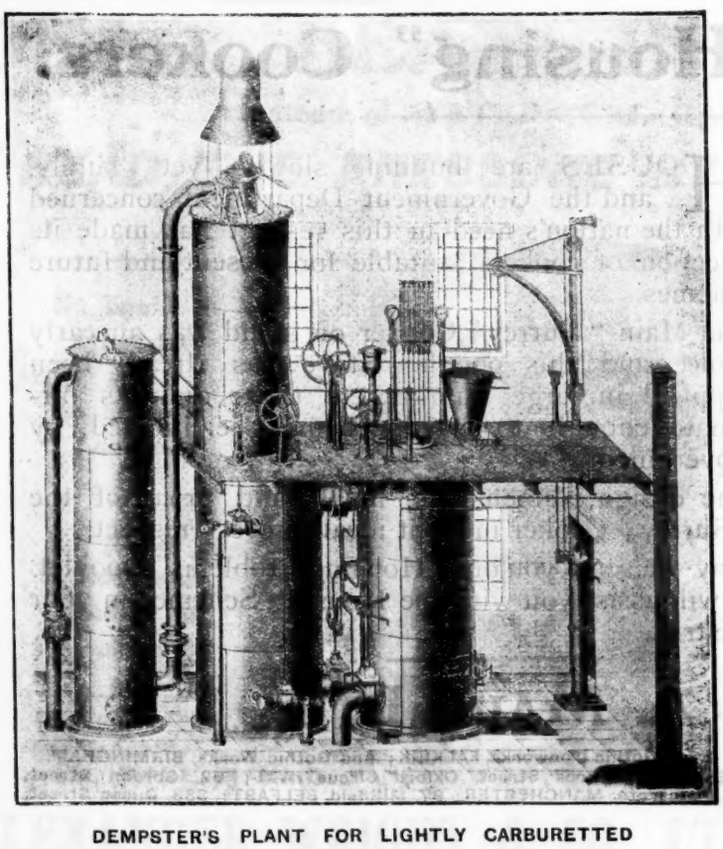
Crude Naphtha: Naked, 10d.; North, 9d. per gallon.

Heavy Naphtha: 3s. 6d. per gallon.

Naphthalene: Refined, £45 per ton nominal; inferior, £35; crude, £14 to £22, according to quality.

Toluol: Naked, 2s. 9d. per gallon nominal. North, 2s. 7d. Pure, 4s.

Creosote: London, 1s. 1d. to 1s. 2d.; North, 1s. 1d.; heavy oil, 10¼d. per gallon in bulk.



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Anthracene: 40-45%, 9d. per unit per cwt.
Grease Oils: 18° Tw. (naked), £6 10s. per ton f.o.r. makers' works.
Aniline Oil: 1s. 5d. to 1s. 6d. per lb., drums extra.
Aniline Salts: 1s. 10d. to 2s. per lb.
Cresylic Acid: 95%, 4s. 9d. to 5s. 3d.; 97-99%, 5s. 3d. to 5s. 6d. per gallon *ex* works London, f.o.b. other ports.
Carbolic Acid: Crude 60%, 4s. 6d. per gallon; crystals 40%, 1s. 4d. to 1s. 5d. per lb. (nominal).
Salicylic Acid: Technical, 3s. 0d. to 3s. 3d.; B.P., 3s. 9d. per lb.

Sulphate of Ammonia.

A fair amount of business is being put through at new season's rates; and in view of the large margin in favour of the farmer, this trade is expected to improve. For shipment, prices are irregular and according to destination; but they appear to be between £38 and £45 per ton. There is no fresh news of importance from America.

Opposition to the South Metropolitan Gas Bill.—The Joint Committee of the Conference appointed by the South London Boroughs has held a further meeting, and agreed to continue the opposition to the South Metropolitan Gas Bill in the House of Commons.

Meters Ltd.—Submitting the accounts of the Company for the year ended March 31, the Directors state that the trading has resulted in a gross profit of £41,161, which is reduced by general management expenses, directors' fees, legal charges, expenses on patents, income-tax, and depreciation of buildings, machinery, and plant. A sum of £9624 has been charged to revenue for repairs and renewals. After providing for interest on debenture stock, the net profit amounts to £25,160 which, with £5123 brought forward, makes £30,283, out of which interim dividends at the rate of 5½ p.ct. per annum upon the preference shares, and 5 p.ct. per annum upon the ordinary shares were paid. The Directors now recommend further dividends at the rate of 5½ p.ct. per annum upon the preference shares, and at the rate of 12 p.ct. per annum upon the ordinary shares (making the ordinary dividend 8⅓ p.ct. for the year, less tax); also the payment of a bonus of 4d. per share (free of income-tax) upon the ordinary shares. They further recommend that £3000 be added to the reserve fund (making the fund £120,000), and that £2000 be reserved for the inauguration of a staff superannuation or other similar fund as may be arranged by the Directors, leaving a balance of £6989 to be carried forward. It is the intention of the Trustees now holding the 30,000 ordinary shares for the benefit of the Company to offer all or any of such shares to the other ordinary shareholders of the Company at a price of 21s. 6d. per share (inclusive of transfer expenses), in proportion to the existing holdings of ordinary shares as at June 17, 1920—say, one share for every six shares then held. But offers may be made for any number in excess of such proportion; and the Trustees propose to dispose of the balance (if any) as and when they think fit. The shares will rank for dividend as from April 1, 1920.

Satisfaction with Results at Workington.

The minutes of the Gas Committee, including the results of the working for the past financial year (showing a net profit of £530), were submitted to the Workington Town Council by Mr. Hall, who said that, considered from any standpoint, the year under review created a new record in every section of the work. The working results showed a splendid advance, the make of gas for the year being 12,834,000 c.ft. more than the previous year (150,255,000 c.ft. as against 137,421 c.ft.) and the yield of gas per ton of coal carbonized 2505 c.ft. better (18,031 c.ft., as against 15,526 c.ft.), an increase of 16⅛ p.ct. This result meant that they saved 1151 tons of coal, or 13·81 p.ct. A remarkable feature that the summary did not disclose was that the great advance had largely been brought about during the last six months of the year. For example, the make up to Sept. 30 last (the first six months) had only increased slightly over 1 million c.ft., whereas in the second six months there was an increase of nearly 12 million c.ft. Again, the yield for the first six months was 17,197 c.ft. per ton of coal, an increase of 1671 c.ft.; but for the second six months the yield was 18,661 c.ft., an increase of 3,135 c.ft.. per ton. He mentioned these facts as to yields as due to Mr. Hedley Hoy (the present Engineer), who, on taking up his duties, effected repairs, clearances, adjustments, and alterations to the plant which made it possible to secure the results obtained. The Committee were quite in agreement with the Engineer as to further successes in yields, &c., as soon as the new plant was brought into operation and tuned-up. The working results, combined with the increased receipts from residuals and fittings, had enabled them to make a record profit of £4972, and to sell gas at a low rate. The new plant was put into operation in October, 1915, and at the end of March had done 4½ years' duty, the cost of upkeep being: Repairs and renewals to settings, £608, an average of £135 per year. As the coal carbonized was 42,333 tons, this was equal to 3·45d. per ton. Repairs and renewals to auxiliary plant cost £392, an average of £87 5s. 2d. per year, or 2·22d. per ton of coal carbonized—a tribute alike to the Contractors (the Woodall-Duckham Company, Ltd.), the management and staff, and last, but not least, to the British workmen who erected and made the plant, and those who from day to day, with splendid care and attention, had worked it.

Stoke-on-Trent and Newcastle Extension Schemes.—A decision has been given by the Ministry of Health regarding the borough extension schemes of the Stoke-on-Trent and Newcastle-under-Lyme Corporations. The most important feature of Stoke-on-Trent's claim was that Newcastle and Wolstanton should be made part of Stoke-on-Trent. In both cases the Ministry have refused the application. They have also rejected Newcastle's claim to include Wolstanton. Stoke has been given parts of two urban and five rural areas contiguous to the borough, and Newcastle receives parts of two rural areas on the western borders.

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Radiators in showroom heated with hot water from the "B.T.U." Boiler in the basement below.

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Radiators in showroom heated by hot water from the "B.T.U." Boiler in the basement below.

The advantages and the economies of the "B.T.U." Gas-Heated Hot-Water Circulators are so well known that repetition here is needless. They are so simple to operate, so easy to instal, so reliable in service, and so good in every way.

Wright's "B.T.U." Gas-Heated Boiler on Iron Stand warming the basement and serving Hot-Water Radiators on higher floor.

The three illustrations will clearly show how easily the "B.T.U." can be utilised for radiator warming. It can be placed in any spare corner and only needs connecting-pipes to the Radiator in any other part of the building. Warming is quite successful with a minimum of expense and a maximum of convenience.

Let us advise you as to the best way of meeting all warming problems.
JOHN WRIGHT & Co., Essex Works, ASTON, BIRMINGHAM.

Alcohol Mixture Experiments.

Some particulars have appeared in "The Times" of petrol substitute tests which have been carried out during the past six months under the direction of Mr. George Shave, the Chief Engineer of the London General Omnibus Company, Ltd. With alcohol and benzol in equal proportions, a mixture was obtained which in efficiency, as compared with petrol, was as 12·5 is to 15. Numerous mixtures of the two fuels were tested, with varying results, both in the shops and on the road; and while the 50 p.ct. mixture was found to be the most satisfactory, its use somewhat impaired the engine. As to cost, this may be represented by the number of B.Th.U. per penny produced by petrol—6050; and by the 50 p.ct. mixture—5000. The cost per mile showed a difference in favour of the former of one-fifth of a penny. The mixture was found to be 12 per cent. more economical than petrol. The difference is 8 per cent. only in cost; petrol being the cheaper to use if the price per gallon of the two is the same. After some further investigations and wider use of the benzol-alcohol mixture in equal proportions, results were obtained which showed that the mixture gave 6·05 miles to the gallon and petrol 7·19, with an economy of 2 p.ct. in favour of benzol-alcohol on the B.Th.U. basis of comparison. It is considered that the efficiency of fuels based on alcohol has now been proved, and that fuels for motor transport should in future be based upon it. The salient points arising from the investigations are that the possible thermal efficiency increases with the increased proportion of alcohol in the fuel for the same compression; that a high proportion of alcohol means also that the compression can be raised, with a consequent rise in the thermal efficiency; and that, so far as the engine is concerned, the bad effects on valve-pockets are more marked at small throttle-openings with high than with low compression. The subject of another test will be a mixture of alcohol and ether.

The Percentage Increase.—In the report of the Education Committee to be presented at the meeting of the London County Council to-day are the estimates for 1920-21. An additional £2845 is provided for gas and electricity; and in connection with it, the following interesting information is given: Under pre-war conditions, the vote for gas and electric light for 1914-15 amounted to £31,273. During the war the increase in the price of gas and electricity amounted approximately to 75 p.ct., but this was to a very large extent nullified by the restrictions in the use of artificial light consequent upon air-raids. Based on current prices and pre-war conditions, the estimate for 1920-21 would be £54,728. Allowing for a reduction in the price of gas, consequent upon the reduction in December, 1919, in the price of coal, and also for the possible continuance to some extent of the practice of rigid economy in the use of artificial light, it is proposed to provide for only a 50 p.ct. increase on the pre-war vote. Provision has, however, to be made for two new school camps, while, on the other hand, one reformatory school will be closed,

Position of the Conway Gas-Works.—There has been referred back by the Conway Town Council to the Committee a proposal to raise the price of gas to 6s. per 1000 c.ft.—the maximum. Mr. Griffiths, in moving the resolution, asked for a report on the whole undertaking, with a view of putting the business on a sound financial footing. Mr. Edwards said that if the Council had not put in a new hydrogen plant, the position would have been very serious, as with the recent advances in wages and coal they were selling gas at less than the cost of production.

Increased Make at Burnley.—The Burnley Corporation Gas Department have had a good year. A preliminary announcement by Mr. J. P. Leather (the Engineer) shows there was a net profit of £17,760. as against an estimate of £13,000. This will be placed to reserve. The previous year, through not being able to increase the price of gas, there was a big loss, which wiped-out the reserve fund and created an adverse balance. The main factor in the present good result has been an increased make per ton; and there has also been a better revenue from residuals. The greatest difficulty was experienced in getting coal; and 25 p.ct. of water gas was made, as against 17 p.ct. Under present conditions, this has been more costly to make. The department have now only about a week's stock of coal.

The Cleobury Mortimer Gas Company, Ltd., have gone into voluntary liquidation, and a meeting of creditors is being held this week.

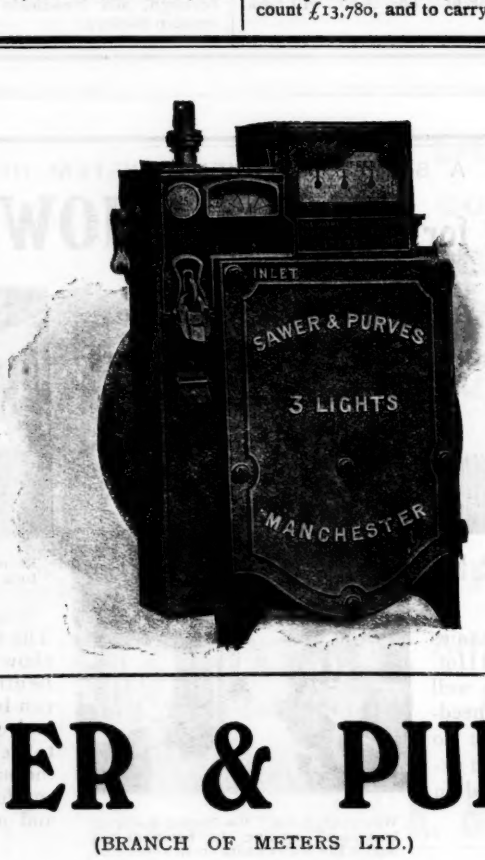
A Ministry of Health inquiry with respect to an application of the Knaresborough Urban District Council to borrow £2000 for the gas undertaking took place last week.

The Dysart Town Council have decided to instal a complete arrangement of "A. and M." [Alder and Mackay] patent pressure wave automatic controllers, together with the "Edinburgh" pattern hurricane-proof copper street gas lanterns to the extent of about 140 lamps.

The Malvern Urban District Council have been considering a scheme for a gas supply to Malvern Link, North Malvern, and West Malvern, and have decided to convert a water-main no longer required for water-works purposes into a gas-main, for the supply to the places mentioned.

The report of the James Keith and Blackman Company to March 31 states that the amount of business transacted exceeded that of any previous year. After providing for debenture interest, excess profits duty, corporation tax, and making sufficient allowance for depreciation and reserves against doubtful debts, the accounts show a net profit of £53,659; and £12,793 was brought forward, making £66,452. Preference dividends absorbed £2112, leaving £64,340. The Directors recommend a dividend for the year on the ordinary shares at the rate of 20 p.ct., free of tax, absorbing £32,000, to transfer to reserve account £13,780, and to carry forward £18,560.

PREPAYMENT METERS



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STOCK MARKET REPORT.

THE week just closed on the Stock Exchange was much the same as its predecessor—only without the Derby. There was an undercurrent of uneasiness widespread, which made folk shy of commitments; and business consequently was very quiet and dull. Movements were, as a rule, highly uncertain and variable; but the predominating tendency was downwards.

The gilt-edged market did not gather strength. In Home Government issues, the tide varied from day to day; the result being that Friday's quotations showed little variation—viz., Consols 46$\frac{11}{16}$-47$\frac{1}{4}$, War Loan, 84$\frac{3}{4}$-85, Funding 69$\frac{3}{4}$-70$\frac{3}{8}$, Victory 76$\frac{1}{4}$-77$\frac{5}{8}$. Bonds were firm, and the new Corporation issues in good demand. Home Rails were in the cold and distinctly flat; and Canadians and Argentines easy.

The Foreign Market did not show out strongly; but Greek and Belgian were steady, and Russians attracted attention.

The Miscellaneous Market went heavily for the most part. Rubbers eased away, and Oils throughout the week were very shifty. Shipping, Nitrates, and Textiles were easier; but Insurance rallied.

Business in the Gas Market was about on a level with the previous week in point of volume; but the general tone was not strong—apparently suffering in some measure from the same uneasy feeling which was depressing markets in general. In the London Companies, the ordinary stocks of the Gas Light and Coke and South Metropolitan Companies showed easier figures, and the quotations fell 2 each. Commercial was unchanged. In Suburban and Provincial, a few issues which had been left standing were corrected. In Continentals, Imperial Continental was fairly steady, and the quotations remained unchanged. Primitivas showed an easier tendency.

Bargains done for cash during the week were as follows: On Monday, European 6, Gas Light ordinary 55, 55$\frac{1}{8}$, 55$\frac{3}{8}$, 56, 56$\frac{1}{8}$, ditto preference 56$\frac{5}{8}$, Imperial Continental 126$\frac{1}{8}$, 127, 127$\frac{1}{8}$, 128, Monte Video 74$\frac{1}{4}$, Oriental 103$\frac{1}{2}$, Primitiva preference 37s. 6d., South Metropolitan 56$\frac{1}{2}$, 57$\frac{1}{4}$, 57$\frac{1}{2}$, Cheltenham 5 p.ct. ordinary 60. On Tuesday, Brentford "A" 50, Gas Light preference 56$\frac{5}{8}$, Imperial Continental 126$\frac{1}{8}$, 127$\frac{1}{8}$, 128, 128$\frac{1}{8}$. Malta and Mediterranean 39s. 6d., 40s. 6d., Primitiva 17s. 6d., ditto preference 35s., South Metropolitan 56, South Suburban 64$\frac{1}{2}$, Chester 5 p.ct. ordinary 73$\frac{7}{8}$, ditto 3$\frac{1}{2}$ p.ct. debenture 59, Exeter 10 p.ct. ordinary 148. On Wednesday, Bombay 5, Gas Light ordinary 54, 54$\frac{1}{2}$, 55, 55$\frac{1}{8}$, 56, ditto preference 56$\frac{1}{2}$, ditto debenture 48, Imperial Continental 126, 127, 127$\frac{1}{4}$, 127$\frac{1}{2}$, 128, ditto debenture 82$\frac{1}{2}$, Monte Video 73$\frac{3}{4}$, 74$\frac{1}{4}$, South Metropolitan 55, 55$\frac{1}{2}$, 57, ditto debenture 48. On Thursday, Continental Union 29$\frac{5}{8}$, 30, Gas Light ordinary 54, 54$\frac{3}{8}$, 54$\frac{13}{16}$, 55, ditto preference 57$\frac{1}{2}$, ditto debenture 46$\frac{1}{2}$, Hong Kong 9$\frac{1}{2}$, 9$\frac{3}{4}$, Imperial Continental 126, 127$\frac{1}{2}$, Primitiva preference 35s., South Metropolitan 55, 55$\frac{3}{4}$. On Friday, European 6, Gas Light ordinary 53, 53$\frac{1}{2}$, 54, 54$\frac{1}{4}$, ditto preference 57, ditto debenture 46$\frac{1}{2}$, Imperial Continental 125$\frac{1}{2}$, 127$\frac{1}{2}$, Primitiva 19s., ditto debenture 69$\frac{1}{2}$, South Metropolitan 54$\frac{1}{2}$, ditto debenture 46$\frac{1}{2}$.

In the Money Market, the position was quite comfortable in the presence of ample supplies, and rates both for short loans and discount were very easy. On Wednesday, silver fell to 45$\frac{5}{8}$d., the lowest price for the last two years, but rallied later. The Bank rate is 7 p.ct., as fixed on April 15.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue.	Share.	When ex-Dividend.	Ante-War Dividend & Bonus.	Last Dividend.	NAME.	Closing Prices, July 30, 1914.	Present Prices.	[Lowest and Highest] Prices of Bargains.
£			p.c.					
182,049	Stk.	Mar. 11	4	4%	Aldershot 4 p.c. Pref. .	...	58—63	...
1,551,868	,,	Mar. 26	2½	5%	Alliance & Dublin Ord.	59—64	37—42	...
374,000	,,	Jan. 15	4	4%	Do. 4 p.c. Deb.	76—79	61—63	...
280,000	5	May 13	7½	8%	Bombay, Ltd. . . .	5⅞—6⅛	4⅝—5⅛	5
50,000	10	Feb. 26	16	10%	Bournemouth Gas and Water — 10 p.c. .	29—30	8½—9	...
383,110	10	,,	7	7%	Bournemouth Gas and Water — B 7 p.c. .	15—15½	9—10	...
115,000	10	,,	6	6/-	Bournemouth Gas and Water — Pref. 6 p.c.	13½—14	8½—9	...
162,065	—	Dec. 30	—	4%	Bournemouth Gas and Water — 4 p.c. Deb.	...	64—66	...
992,045	Stk.	Feb. 12	14	30/-	Brentford A Consolid. .	261—266	47—52	50
734,920	,,	,,	11	26/3	Do. B New . .	204—209	45—50	...
55,000	,,	,,	5	5%	Do. 5 p.c. Pref. .	109—111	70—75	...
221,400	,,	June 10	4	4%	Do. 4 p.c. Deb. .	91—93	63—65*	...
214,775	,,	Mar. 11	11	7½%	Brighton & Hove Orig. .	208—213	121—126	...
244,200	,,	,,	8	5½%	Do. A Ord. Stk.	154—159	80—85	...
1,287,500	Stk.	Feb. 26	5	5%	Bristol 5 p.c. max. . .	...	...	...
530,000	20	April 14	12½	10%	British	44—45	24—26	...
120,000	Stk.	Dec. 30	4	4%	Do. 4 p.c. Deb. Stk.	88—90	59—61	...
245,771	,,	,,	4	4%	Buenos Aires 4 p.c. Deb.	85—87	47—50	...
100,000	10	May 27	—	—	Cape Town & Dis., Ltd.	1½—2½	7—7½	...
100,000	10	,,	—	4½%	Do. 4½ p.c. Pref. .	4—6	5½—6½	...
100,000	Stk.	Dec. 30	4½	4½%	Do. 4½ p.c. Deb. Stk.	70—75	58—63	...
157,150	,,	Feb. 26	5	5%	Chester 5 p.c. Ord. . .	108—110	...	73½
1,533,280	,,	Feb. 26	5/9/4	33/4	Commercial 4 p.c. Stk.	106—108	51—56	...
560,000	,,	,,	5½	26/8	Do. 3½ p.c. do.	103—105	44—49	46
475,000	,,	June 10	3	3%	Do. 3 p.c. Deb. Stk.	69½—71½	45—47*	...
800,000	,,	Dec. 11	4	—	Continental Union Ltd.	76—70	27—32	29½—30
200,000	,,	,,	7	—	Do. 7 p.c. Pref.	115—118	40—60	...
51,600	,,	Feb. 26	14½	10½%	Croydon A 10 p.c. . .	...	130—140	...
278,400	—	,,	11½	7½%	Croydon B and C 7 p.c.	...	90—100	...
492,270	Stk.	—	6	5%	Derby Con. Stk. . .	123—125	...	...
55,000	,,	—	4	4%	Do. Deb. Stk. .	102—104	...	...
1,002,180	10	Jan. 29	10	5/0	European, Ltd. . . .	17½—18	6—7	6
16,298,975	Stk.	Feb. 12	4/17/4	30/-	Gas Light and Coke — 4 p.c. Ord. . .	98—102	53—56	53—56½
2,600,000	,,	,,	3½	26/8	Gas Light and Coke — 3½ p.c. max. .	76—79	37—42	...
4,062,235	,,	,,	4	4%	Gas Light and Coke — 4 p.c. Con. Pref.	96—99	55—58	56½—57½
4,674,850	,,	Dec. 11	3	3%	Gas Light and Coke — 3 p.c. Con. Deb.	72½—74½	45—48	46½—48
130,000	,,	,,	10	10%	Gas Light and Coke — 10 p.c. Bonds. .	...	...	...
82,500	,,	Mar. 11	5	3½%	Hastings & St. L. 5 p.c.	...	55—60	...
258,740	,,	,,	3½	2½%	Do. 3½ p.c.	87—89	38—43	...
70,000	10	May 13	11	7%	Hongkong & China, Ltd.	16½—16¾	8½—9½	9¼—9½
86,600	Stk.	Mar. 11	9	6½%	Hornsey 7 p.c. . . .	...	88—93	...
131,000	,,	,,	7½	5½%	Ilford A and C . . .	151—154	86—91	...
65,780	,,	,,	6½	4½%	Do. B	115—118	65—70	...
65,500	,,	Dec. 30	4	4%	Do. 4 p.c. Deb. . .	92—94	57—60	...
4,940,000	,,	May 14	9	4½%	Imperial Continental .	150—160	125—130	125½—128½
1,235,000	,,	Feb. 12	3½	3½%	Do. 3½ p.c. Deb. Red.	84—86	80—85	82½
235,242	,,	Mar. 26	6½	5½%	Lea Bridge Ord. 5 p.c. .	119—121	80—85	...
2,498,905	,,	Feb. 26	10	37/6	Liverpool 5 p.c. Ord. — A.	211—213	...	...
					Liverpool 5 p.c. Ord. — B.	146—148		...
306,083	,,	June 26	4	4%	Do. 4 p.c. Pr. Deb. Stk.	...	...	...
165,736	,,	Feb. 26	7/5/6	3½%	Maidstone 5 p.c. . .	...	52—57	...
75,000	5	June 11	6	3%	Malta & Mediterranean	4½—4¾	1¾—2¼	39/6—40/6
250,000	100	April 1	4½	4½%	Met. of Melbourne — 4½ p.c. Deb.	99—101	89—96	...
541,920	Stk.	May 27	4	6%	Monte Video, Ltd. . .	11½—12	70—75	73¼—74¼
1,875,892	,,	Feb. 26	4½	3½%	Newcastle & Gatsh'dCon.	98½—99½	61½—62	...
529,705	,,	Dec. 30	3½	3½%	Do. 3½ p.c. Deb.	82—83	53—55	...
15,000	10	Mar. 11	—	8½%	North Middlesex 10 p.c.	...	13—13½	...
55,940	10	,,	7/14/0	6½%	,, ,, 7 p.c.	14—15	7½—8½	...
300,000	Stk.	May 13	8	8%	Oriental, Ltd. . . .	117—122	102—105	103½
60,000	5	Mar. 26	10	1/-	Ottoman, Ltd. . . .	7½—7¾	3—4	...
60,000	50	Mar. 11	13	7½%	Portsea Island, B . .	128—131	66—71	...
100,000	50	,,	12	6½%	Do. C . .	118—121	53—58	...
249,980	5	April 29	8	—	Primitiva Ord. . . .	5½—6	1—1½	17/6—19/-
499,960	5	June 26	5	—	Do. 5 p.c. Pref. .	4¼—5	1½—2½	35/—37/6
521,600	100	June 1	4	4%	Do. 4 p.c. Deb. .	91—93	69—71	69½
600,000	Stk.	Jan. 29	4	4%	Do. ,, ,, 1911	...	47—50	...
346,198	,,	Dec. 30	4	4%	River Plate 4 p.c. Deb.	85—87	47—50	...
150,000	10	Mar. 26	6	6/-	San Paulo — 6 p.c. Pref.	10¼—11	7¼—7½	...
125,000	50	Dec. 30	5	5%	San Paulo — 5 p.c. Deb.	47—49	39—41	...
135,000	Stk.	Mar. 11	10	50/-	Sheffield A	223—224	68—73	...
209,984	,,	,,	10	4½%	Do. B	222—224	58—63	...
523,500	,,	,,	10	35/5	Do. C	220—222	54—57	...
133,201	Stk.	Sept. 12	4	4%	Shrewsbury 5 p.c. . .	...	...	...
90,000	10	Oct. 15	9	10%	South African . . .	10½—11½	12—13	...
6,609,895	Stk.	Feb. 12	5/4/0	30/-	South Met. 4 p.c. Ord..	111—113	54—57	54½—57½
250,000	,,	Jan. 15	—	5%	Do. Pref. . .	...	93—95	...
1,895,445	,,	,,	3	3%	Do. 3 p.c. Deb..	72½—74½	45—48	46½—48
224,820	,,	Feb. 26	3½	3½%	South Shields Con. Stk.	157—159	103—104	...
1,087,705	,,	Aug. 14	6	3½%	S'th Suburb'n Ord. 5 p.c.	114—116	64—69	64½
247,558	,,	Dec. 30	5	5%	Do. 5 p.c. Deb. Stk.	116—118	78—83	...
647,740	,,	May 13	7½	3½%	Southampton Ord. . .	99—102	57—60	...
121,275	,,	Dec. 30	4	4%	Do. 4 p.c. Deb. Stk.	...	61—63	...
120,000	,,	Aug. 14	—	3½%	Tottenham and District — A 5 p.c. .	135—138	60—65	...
782,275	,,	,,	6	2½%	Tottenham and District — B 3½ p.c. .	115—117	50—55	...
181,255	,,	June 10	4	4%	Tottenham and District — 4 p.c. Deb.	87—89	60—63*	...
182,380	10	Dec. 30	5	—	Tuscan, Ltd. . . .	5—6	1—2	...
149,900	10	July 1	5	5%	Do. 5 p.c. Deb. Red.	93—95	45—50	...
236,476	Stk.	Mar. 11	5	3½%	Tynemouth 5 p.c. max.	108½—109	71—73	...
					Wandsworth, Wimbledon, and Epsom—			
30,000	,,	Feb. 26	8½	55/-	Wandsworth A 5 p.c.	151—156	83—88	...
255,636	,,	,,	6½	40/-	Do. B 3½ p.c.	129—134	61—66	...
108,075	,,	,,	—	38/6	Do. C . . .	...	61—66	...
140,865	,,	,,	—	38/6	New Ordinary	...	61—66	...
352,000	,,	,,	6½	33/9	Wimbledon 5 p.c. . .	117—122	60—65	...
98,000	,,	,,	6½	40/-	Epsom 5 p.c. . . .	121—126	60—65	...
88,416	,,	Dec. 30	3	3%	3 p.c. Deb. Stk. . .	66—69	45—48	...

* Ex Div.

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